Executive-Employee Pay Gap and Labour Investment Efficiency: Evidence from China

ABSTRACT

This study investigates the impact of the executive-employee pay gap on labour investment efficiency, focusing on Chinese listed firms from 2006 to 2021. Results reveal a positive relationship between the pay gap and labour investment efficiency, largely driven by reduced agency costs. Furthermore, findings suggest that employee stock ownership plans (ESOPs) can substitute the pay gap's role in mitigating labour investment inefficiencies. Additional analysis indicates that the pay gap effectively addresses labour under- and over-investment issues and reduces labour cost stickiness. This study contributes to the literature on executive compensation and labour efficiency by demonstrating that executive-employee pay disparity influences operational decisions, particularly within China's high-power distance context. The findings endorse tournament theory, showing that structured incentives can alleviate agency conflicts, thus providing actionable insights for managers and policymakers to optimize compensation frameworks for improved productivity.

Keywords: Pay Gap; Tournament Theory; Labour Investment Efficiency; Corporate Governance

1. INTRODUCTION

In this paper, we examine the impact of the pay gap between corporate executives and employees on labour investment efficiency in China. The labour factor, along with its broader term 'human capital', plays a crucial role in determining the speed and quality of economic growth. It is an essential component of firms' production function, contributing positively to their competitiveness and long-term sustainable economic growth (Jung et al., 2014; Pfeffer, 1994). The labour costs account for a substantial part of the operating expenditures. For instance, The US Census Bureau's Annual Survey of Manufacturers reports show that payroll and employee benefits in the manufacturing sector totalled $923 billion in 2015, while capital expenditures amounted to $240 billion (Habib & Hasan, 2021). Paycor (2022) also reports that about 70% of total business costs are labour costs and they have kept increasing in many industries in the past several years. China, on the other hand, had enjoyed a competitive advantage stemming from the low labour cost in the early periods of its reform and opening-up policies. However, Rosemary Coates, the Executive Director of Reshoring Institute, stated that China is no longer a low-cost country as it was before due to the maturity curve and increased labour cost rates.[1]

Moreover, The World Population Prospects reveals that there were 771 million people aged 65 years or over globally in 2022, which is three times more than the size in 1980 (258 million). This number will be projected to reach 994 million by 2030 and 1.6 billion by 2050.[2] Therefore, it is a critical and difficult task to maximize the benefits and operational efficiencies by investing in human capital formation in such an advanced stage of the demographic transition. Concerning China, Shouhong Huang, the director of the Chinese State Council Research Office, pointed out that there is a workforce gap of 30 million people in China's manufacturing industry and the potential demand for aged care workings is more than 10 million while the current supply is only above 300,000.[3] In sum, in the case of the reduction of labour supply and the rise of labour costs, effective labour investment is of great significance to strengthening firms' competitive advantage, improving input-output efficiency and promoting the development of the world economy.

Effective labour investment can be described as hiring employees at the optimal level justified by the firm's economic fundamentals, and the factors affecting such employment decisions have received substantial attention in academia (e.g., Cao & Rees, 2020; Ding et al., 2021; Jung et al., 2014; Kong et al., 2018). Similar to other types of investments, agency conflicts and information asymmetry are the two main determinants of labour investment (Cronqvist et al., 2009; Jung et al., 2014; Stein, 2003). Prior studies have investigated internal and external determinants of labour investment efficiency, affecting either agency conflicts or information asymmetry. Regarding internal factors, financial reporting quality (Cao et al., 2023; Jung et al., 2014), corporate governance (Khedmati et al., 2020; Le & Tran, 2022), ownership structure (Ghaly et al., 2020; Gu et al., 2022), and operational decisions (Cao & Rees, 2020; Habib & Hasan, 2021; Wang et al., 2024) have been found associated with

[1] https://www.logisticsmgmt.com/article/global_labor_rates_china_is_no_longer_a_low_cost_country
[2] https://population.un.org/wpp/
[3] https://www.chinanews.com.cn/cj/2024/03-06/10175109.shtml

corporate employment decisions. Analyst and media coverage (Lee & Mo, 2020; Liu et al., 2023), political environments and connections (Kong et al., 2018; Li & Wu, 2023; Yang et al., 2024; Zhou et al., 2023), and capital and labour market characteristics (Guo et al., 2021; Yuan et al., 2023) are some external determinants of labour investment efficiency. In this paper, we explore the impact of the compensation differences between corporate executives and other rank-order employees on employment decisions from an *internal* perspective.

Compensation, especially financial compensation, is the main reason why most workers work in modern society, and thus, the pay structure alters workers' behaviours including their work efficiency and work performance (Lazear, 2018). Therefore, compensation is crucial for firms to attract and retain high-quality employees. In addition to the absolute compensation levels, the relative compensations could also incentivize workers to perform their tasks (Lazear & Rosen, 1981; Lazear, 2018; Sun & Habib, 2020). The relative compensations could be measured as the compensation differences between different firms or different ranks of workers, which are normally called "*pay gap*" in the literature.[4] The incentives created by pay gaps are described as "tournament incentives". After being initiated by Lazear and Rosen (1981), academic scholars have extensively discussed the effects of pay gaps within the top management team, between executives and employees, within the same industry/region on economic consequences (e.g., Coles et al., 2018; Kale et al., 2009; Ma et al., 2020; Xu et al., 2017). In this paper, we focus on the pay gaps between executives and rank-order employees due to their importance in corporate employment and the widening gaps over recent decades (Connelly et al., 2014). We posit that the pay gap between executives and other employees will not only affect the decision-making behaviour of executives but also alter the working behaviour of employees.

Two competing theories describe the economic incentives of the pay gap: the tournament theory and comparison theories. The tournament theory first links executive compensation with the relative performance of tournament participants (Lazear & Rosen, 1981). The best performer in the tournament will receive a high prize. Rosen (1986, p.714) further states that "payments at the top have indirect effects of increasing productivity of competitors further down the ladder." Thus, a higher pay gap induces

[4] In the literature, the pay gap, pay disparity, and pay inequality are interchangeable. Throughout this paper, we use the ***pay gap*** to represent the compensation differences between workers.

higher individual effort and is productivity-enhancing. Comparison theories suggest that employees are not only concerned about how much they earn in absolute terms but also how much they earn relative to others (Adams, 1965; Festinger, 1954; Martin, 1981). The pay gap will increase feelings of unfairness and hence, lead to decreased employee morale, reduced individual effort, low productivity and commitment, and high turnover, among others (Akerlof & Yellen, 1990; Bolino & Turnley, 2008; Chen & Sandino, 2012; Cowherd & Levine, 1992; Shaw & Gupta, 2007). The previous literature finds mixed results that either support the tournament theory or comparison theories (e.g., Connelly et al., 2016; Cullen & Perez-Truglia, 2022; Firth et al., 2015; Mueller et al., 2017; Xu et al., 2017). Several studies integrate both the tournament theory and comparison theories and find non-linear associations (Dai et al., 2017; Han et al., 2022; Luo et al., 2020). Given the competing theoretical views, the impact of the pay gap on labour investment efficiency remains an empirical question.

Using a sample of Chinese A-share listed firms spanning the period 2006 to 2021, we find that the executive-employee pay gap has a significantly positive effect on labour investment efficiency. The reported coefficient in our basic model suggests that a one-standard-deviation increase in the pay gap improves the efficient labour investment by 10.27%. This finding supports the tournament theory, which suggests that both executives and employees can get motivated or have strong incentives from such pay gaps to put in greater efforts for future promotions or rewards, leading to lower agency problems. Our channel test confirms the reduction of agency costs could be a possible mechanism through which the pay gap can increase labour investment efficiency. The reduced agency problems increase executives' willingness to control labour costs and make more effective labour investment decisions, and the pay gap provides strong incentives to employees to work hard to obtain higher positions and benefits in the firm, which encourages a stable and dynamic workplace and facilitating quicker labour adjustment when needed.

The firm-fixed effect model, propensity score matching approach, and the two-stage-least-squares model are conducted to alleviate the endogeneity concerns stemming from time-invariant firm characteristics, differences in observable variables, and reverse causality. Our findings remain robust to a battery of sensitivity tests that include using alternative measures of pay gaps, alternative measures of labour investment efficiency, excluding the effects of the external pay gap, industrial robot applications, and other types of investment.

Further, we run several additional analyses and yield insightful findings. First, we argue that employee stock ownership plans change employees' roles to shareholders, which enhances productivity and constrains executives' self-interested behaviour, leading to improved labour investment efficiency. Our results show that the positive effect of the pay gap is stronger in firms without an employee stock ownership plan, indicating a substitutive monitoring effect of the employee stock ownership plan for the executive-employee pay gap. Second, we extend the analysis by examining the impact of the executive-employee pay gap on over-investment in labour and under-investment in labour. Executives may over-invest due to empire-building or under-invest to meet financial targets, both of which are inefficient. Our results show that the executive-employee pay gap reduces both labour overinvestment and labour underinvestment activities. Finally, we examine the executive-employee pay gap's impact on monetary-related labour investments, specifically labour cost stickiness. Given that cost stickiness increases with agency problems (Chen et al., 2012), and the executive-employee pay gap reduces agency costs, we expect firms with a higher pay gap to exhibit lower labour cost stickiness. The results support our theoretical prediction.

This study contributes to the existing literature in several aspects: First, it enriches the literature on executive compensations and labour investment efficiency. Chowdhury et al. (2022) show a positive association between the CEO’s external labour market compensation incentives and labour investment efficiency. Using different equity compensations, Sualihu et al. (2021a) find that stock options reduce efficient labour investments, whereas restricted stock increases labour investment efficiency. In this paper, we investigate the impact of the relative compensations between executives and lower-ranked employees on corporate labour investment decisions. Supporting the tournament theory, our results show more efficient labour investments when the executive earns more than other employees.

Second, this study enriches the literature on pay gaps' economic consequences. Previous studies mainly focus on the pay disparity within the executive teams (e.g., Phan et al., 2017; Siegel & Hambrick, 2005; Sun et al., 2019; Vieito, 2012), whereas our findings contribute to the scarce literature on the pay disparity between executives and employees. We explore the effects of pay gaps on a firm’s operational decisions (i.e., labour investment) and possible mechanisms between them. Specifically, we find that the executive-employee pay gap positively affects labour investment efficiency by reducing agency costs. Since absolute performance-based compensation incentives may exacerbate agency problems (Sun & Habib, 2020), our results support the use of tournament-based incentives to alleviate such problems. It can help the firm to adopt an optimum compensation plan.

Third, our study responds to the call for more research on tournament incentives in the Asia-Pacific region (Sun & Habib, 2020). As a country with high power distance, China provides an interesting institutional setting to explore the behaviour of both executives and employees. We find that employees do not consider the pay gap between executives and employees as unfair because of the widely recognized and accepted hierarchical system and the existence of high power distance. Instead, such pay gaps will provide additional incentives to employees to pursue future promotions and obtain benefits. Our study also complements Kuang et al.'s (2024) finding that the productivity of employees exposed to higher levels of cultural traditionality including power distance decreases with the reduced pay gap.

The paper is organized as follows. We review the literature and develop our hypothesis in Section 2. Section 3 presents the research design. The main results, endogeneity test results, and robustness test results are presented and discussed in Section 4. Section 5 reports the channel analysis and Section 6 shows the results of additional analyses. Section 7 concludes our study.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Determinants of Labour Investment Efficiency

Labour investment is an important component of firm investments, and effective labour investment can enhance the competitiveness of firms and improve input-output efficiency. Similar to general types of investment, agency conflicts and information asymmetry also significantly affect employee decisions (Cronqvist et al., 2009; Jung et al., 2014; Stein, 2003). The determinants of labour investment efficiency can be categorized into two groups: internal and external factors that affect agency conflicts, information asymmetry, or both.

Regarding internal factors, Jung et al. (2014) find that efficient investments in labour are positively associated with financial reporting quality, proxied by short-term working capital accruals. Similarly, Cao et al. (2023) posit and find that real earning smoothing activities increase labour investment efficiency by conveying private information about future earnings to capital market participants. Considering corporate governance, Le and Tran (2022) show that board reforms facilitate efficient labour investment using data from 41 countries because of the reduced agency conflicts and information asymmetry after reforms. The ownership structure also contributes to corporate employee decisions. Ghaly et al. (2020) report that the presence of long-term institutional investors, who play a monitoring role to managers, improves labour investment efficiency. Using institutional investors' site visits as a way to acquire information, Lai et al. (2022) support the positive impacts of institutional investors on employment decisions using Chinese data. Unlike institutional investors, controlling shareholders may expropriate minority shareholders (i.e., another type of agency conflict) due to the unbalanced power they have over the corporate resource (Jiang et al., 2010). Gu et al. (2022) find that controlling shareholder expropriation significantly increases the labour investment inefficiency in both Chinese state-owned and non-state-owned enterprises (SOE and non-SOE hereafter). However, the board reform implemented by the controlling shareholders of Chinese central SOEs reduces overinvestment in employees in such SOEs (Fan et al., 2022).

Moreover, firms' operational decisions/performance also affect labour investments. For instance, the digital transformation level (Wang et al., 2024), the adoption of a defender-type business strategy (Habib & Hasan, 2021), and employee treatments (Cao & Rees, 2020) play positive roles in making employment decisions. Notably, Cao and Rees (2020) suggest that employee-friendly treatments increase labour investment efficiency by helping firms easily attract high-talent employees from the labour market and retain existing talented employees in the firm. On the other hand, asset redeployability (Le & Ouyang, 2023), corporate diversification level (Bai et al., 2023), and the adoption of a prospector-type business strategy (Habib & Hasan, 2021) are negatively associated with the efficiency of labour investment. Habib and Hasan (2021) attribute the inefficient labour investment decisions to the difficulties in predicting labour demand in rapidly growing firms (i.e., prospectors), instead of the agency problems.

The monitoring and information-providing roles played by the external market participants also facilitate labour investment efficiency. Using a sample of Chinese listed firms, Liu et al. (2023) find that media coverage can effectively enhance labour investment efficiency. Similar findings have been presented for the level of analyst coverage (Lee & Mo, 2020) and their forecast properties (Sualihu et al., 2021b) in the U.S. Ben-Nasr and Alshwer (2016) show that the trading activities of investors, as reflected in the stock price informativeness, also lead to high-efficient labour investment. Ding et al. (2021) find that the efficiency of labour investment declined after the introduction of short selling in China, implying that downward price pressures stemming from short selling incentivize firms to overinvest in labour to convey favourable information to market participants. As an important capital provider in China, the competition of banks could reduce the information asymmetry of surrounding firms and increase access to credit capital, leading to increased efficiency of labour investment (Gao & Xu, 2023; Lai et al., 2023).

Furthermore, the government also plays a vital role in micro- and macro-economies, especially in China (e.g., Jiang & Kim, 2020). In the case of employment, the Chinese government and its officials can influence firms' employment decisions to maintain social stability and achieve the goal of promoting employment, leading to sticky labour costs and inefficient labour investment, especially in SOEs (Gu et al., 2020; Kong et al., 2018). To receive the huge benefits from high political ranking and political connections (Jiang & Kim, 2020), not only the local politicians but also the politically connected executives will try to contribute to the macroeconomic indicators by adjusting employment decisions, inducing lower labour investment efficiency (Kong et al., 2018; Zhou et al., 2023). However, Li and Wu (2023) find that the central government could use industrial policies to alleviate the policy burdens imposed by the local government to adjust the allocation of labour resources, thereby improving labour investment efficiency. The enhanced tax governance through digitalization, adopting the Golden Tax Phase III system, is also found to be positively associated with labour investment efficiency (Yang et al., 2024). Focusing on labour market characteristics, recent studies find that labour protection decreases labour investment efficiency (Guo et al., 2021), whereas the level of labour marketisation promotes efficient labour investment (Yuan et al., 2023).

2.2 Consequences of Executive-Employee Pay Gap

In recent years, the pay gap, as a topic of great interest, has attracted extensive discussion and research not only among management scholars (Connelly et al., 2014) but also among accounting and finance scholars (Sun & Habib, 2020). However, a conclusive consensus has not been achieved yet regarding the consequences of the pay gaps. Two streams of theories that dominate the pay gap literature are the tournament theory and comparison theories.

Tournament theory was first proposed by Lazear and Rosen (1981), which links executive compensation with the relative performance of tournament participants. They stated that the difference in prize (i.e., the pay gap) between winners and losers, rather than the absolute level of prize, truly determines the amount of effort exerted by tournament participants. Rosen (1986, p.714) also states that "payments at the top have indirect effects of increasing productivity of competitors further down the ladder." Therefore, higher pay gaps induce higher individual effort and are productivity-enhancing. So far, tournament incentives can be captured by the pay gaps within the top management team, between executives and employees, and within the same industry (e.g., Coles et al., 2018; Kale et al., 2009; Lazear, 2018; Ma et al., 2020; Wade et al., 2006; Xu et al., 2017). In this study, we focus on the pay gap between executives and other employees.

Contrary to tournament theory, pay gaps' detrimental effects have been widely discussed based on comparison theories including social comparison theory, equity theory, and relative deprivation theory (Adams, 1965; Festinger, 1954; Martin, 1981). These theories suggest that employees are not only concerned about how much they earn in absolute terms but also how much they earn relative to others. The feeling of unfairness will increase with the pay gap, which leads to decreased employee morale, reduced individual effort, low productivity and commitment, and high turnover, among others (Akerlof & Yellen, 1990; Bolino & Turnley, 2008; Chen & Sandino, 2012; Cowherd & Levine, 1992; Shaw & Gupta, 2007).

Prior studies find mixed results mainly supporting either the tournament theory or comparison theories, depending on which theory dominates in specific research questions. Xu et al. (2017) support the tournament theory by finding a positive association between the pay gap and firms' innovation activities using Chinese data. Using China's policy on pay caps on executive compensations in 2015 as an exogenous shock, Jiao et al. (2024) find that bank misconduct activities significantly increased after reform for banks with high pre-reform pay gaps.[5] Their results suggest that the

[5] China's State-owned Assets Supervision and Administration Commission (SASAC) enforced a pay cap on

reduction in pay gap increases the agency costs resulting in weakening the monitoring function of executives on bank misconduct. From the employee's perspective, Cullen and Perez-Truglia (2022) conduct a natural field experiment with a sample of 2,060 employees from a large corporation in Southeast Asia and find that employees will be more optimistic about their salaries in the future and put more effort into their jobs when they know that their managers earn more. The pay gaps are also found to be positively associated with firm operating performance and valuation (Banker et al., 2016; Mueller et al., 2017). However, instead of tournament theory, these two prior studies attribute better firm performance and valuation to economic theories of matching and managerial talent. Specifically, talented executives will receive wage premiums as they perform better in decision making and there is a scarcity of talented executives in the labour market.

Supporting comparison theories, Firth et al. (2015) find that the relative compensation levels between the three highest directors and average employees lead to lower production efficiency. While Connelly et al. (2016) find a short-term performance-enhancing effect of the pay gap, they also reveal its detrimental impact on long-term firm performance, consistent with the comparison theories. Recent studies integrate both the tournament theory and comparison theories and find non-linear associations between pay gaps and certain outcomes (Dai et al., 2017; Han et al., 2022; Luo et al., 2020). Both too large and too small pay gap could adversely affect the players' incentives for participating in the competition (Sun & Habib, 2020). Therefore, the productive output from the pay gap will be maximized when it is "optimal" (Lazear & Rosen, 1987). Dai et al., (2017) document an inverted-U association between the pay gap and firm productivity, where the tournament theory dominates below the optimal level and the comparison theories dominate beyond the optimal level. Similar results are found in the relationship between internal control quality and the pay gap in Chinese SOEs (Han et al., 2022). On the contrary, Luo et al. (2020) find a U-shaped relationship between the pay gap and firm performance. Overall, there is still a debate on whether there is an "optimal" level of pay gap between executives and employees, and if so, what is the "optimal" level.[6]

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executives of SOEs in 2015, which intended to narrow the pay gap ratio of the average compensation of executives and the average salary of employees to a ratio of 7:1 or 8:1 (State Council, 2014).

[6] For example, China's SASAC intended to reduce the pay gap ratio to 7:1 or 8:1(State Council, 2014). Dai et al. (2017) show an optimal level of the pay gap ratio is around 4:1 on average and varies in different industries, whereas Han et al. (2022) do not explore the optimal level. Xu et al. (2017) also find a possible non-linear association between

2.3 Hypothesis Development

Generally, the employment decisions are primarily made by the top management team. On the other hand, the attitude towards work held by ordinary employees also affects their productivity, firm performance, and hence, firms' employment needs. Prior studies confirm the influencing role of executives in labour investments (Chowdhury et al., 2022; Khedmati et al., 2020; Li et al., 2023; Sualihu et al., 2021a; Wang et al., 2022), whereas existing studies have paid little attention to rank-order employees, except for Cao and Rees (2020).[7]

Khedmati et al. (2020) provide evidence that the board's monitoring role weakens when CEOs have stronger ties to independent board members, leading to inefficient labour investment. Wang et al. (2022) reveal that corporate executives engage in empire-building activities through over-hiring activities (i.e., inefficient labour investment) when their firms purchase liability insurance that reduces executives' litigation risks. Regarding executives' characteristics, overseas experience, especially overseas study experience, could improve labour investment efficiency (Li et al., 2023). Two recent studies focus on the impacts of executive compensations on labour investment efficiency, which are closely related to our study. Sualihu et al. (2021a) investigate the opposing effects of different types of equity compensation incentives on labour investment, whereas Chowdhury et al. (2022) explore the promoting effect of CEOs' external labour market compensation incentives on such investments. In this paper, we examine the effects of incentives created by relative compensation (i.e., the pay gap between executives and employees).

As reviewed in Section 2.1, the key causes of inefficient labour investment by firms are the exacerbation of agency conflicts and the problem of information asymmetry. The executive-employee pay gap can enhance labour investment efficiency by reducing agency costs. Acting as agents of shareholders, both executives and employees can get motivated or have strong incentives from such pay gaps to put in greater efforts for future promotions or rewards, leading to lower agency problems.

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the pay gap and innovation outputs, but they prove that the linear association is more reliable after conducting additional analyses. On the other hand, Luo et al. (2020) document that the absolute pay gap will only be beneficial to firm performance if it is higher than 122,723 CNY on average (65,131 CNY for SOEs and 160,735 CNY for non-SOEs).

[7] Cao and Rees (2020) examine the effect of employee treatment on labour investment in the U.S., whereas Arvidsson et al. (2024) explore the relationship between employees' job satisfaction and capital investment efficiency in Germany.

From the perspective of executives, according to tournament theory, executives could be monitored by the lower-ranked employees and a high pay gap is also a symbol of identity and social status (Phelps Brown, 1979; Sun & Habib, 2020), which also can reduce agency costs. Thus, executives are inclined to maintain better performance, engage in less unethical activities, and make rational operating decisions to protect their reputations and compensations. In addition, economic theories of matching suggest that talented executives receive wage premiums because they perform better in decision-making (Banker et al., 2016; Mueller et al., 2017). As a result, executives are more likely to invest in labour efficiently when the pay gap is high.

From the employees' point of view, knowing the compensations at given levels in the organization hierarchy will encourage them to work harder to get promoted to a higher level and then, receive large rewards (e.g., higher compensation) (Clark et al., 2009; Cullen & Perez-Truglia, 2022; Rajgopal & Srinivasan, 2006). This effect may be more pronounced in China, a country with high power distance because of the unique hierarchical bureaucracy of Chinese society (Hofstede, 1980). Schwartz (1999) concludes that employees in countries with a high power distance exhibit a preference for hierarchical organizational structures due to their aspiration for upward mobility within the hierarchy. Tournaments will be more prevalent in such countries since tournaments promote power inequality and provide hierarchical incentives to be promoted (Burns et al., 2017). Thus, if employees widely recognize and accept the existence of high power distance, they will not consider the pay gap as unfair. Instead, promotions and obtaining higher positions and benefits in the firm serve as strong incentives for employees, which can reduce employee turnover and help the firm retain and attract talented employees in the labour market. These factors will increase labour investment efficiency by encouraging a stable and dynamic workplace and facilitating quicker labour adjustment when needed. Kuang et al. (2024) support this argument by finding that employee productivity significantly reduced after the enforcement of China's policy on pay caps on executive compensations in 2015, especially for those exposed to higher levels of cultural traditionality.

However, on the other hand, the executive-employee pay gap can reduce the labour investment efficiency of firms by increasing employee turnover or reducing productivity according to comparison theories. When employees perceive their compensation as unfair, they become dissatisfied with their work and may choose to leave for fair treatment, creating an unstable workplace. They may find alternative ways to shirk (i.e., reduce actual input or outcomes) if they decide not to leave the firm, which may require the firm to make layoff decisions. The search and training costs for new employees and the adjustment costs (e.g., severance payment) could prevent the firm from making timely adjustments, given that the labour costs are also sticky (Prabowo et al., 2018). Based on the competing theories, we, therefore, state a non-directional hypothesis as follows:

> *Hypothesis 1. There is no association between the executive-employee pay gap and labour investment efficiency.*

3. RESEARCH DESIGN AND SAMPLE

3.1 Data and Sample Selection

As the data on the number of employees starts from 1999, our initial sample includes all A-share Chinese firms listed on the Shanghai and Shenzhen Stock Exchanges from 1999 to 2022 and consists of 56,736 firm-year observations, with the available information to estimate labour investment efficiency (see Section 3.2). All data are retrieved from the China Securities Market and Accounting Research (CSMAR) database. We apply the following procedures to construct our final sample for empirical tests: First, we drop financial firms (CSRC code: J66-J69; 1,158 observations) since the different regulatory environments and accounting reporting rules in that industry. Second, we eliminate 2,532 observations with special treatments, including ST, *ST, and PT firms, given that these firms have a higher risk of being delisted. Third, we exclude 15,769 observations because they have fewer than 30 employees (Kong et al., 2018) or are obvious outliers (e.g., with negative total assets, negative current liabilities, negative long-term liabilities, or leverage ratios above one). Fourth, due to the availability of compensation data and labour investment efficiency being a one-year-ahead measure in the empirical model (see Section 3.2), 4,027 observations are dropped further. Fifth, we exclude 18,945 firm-year observations because they have missing control variables. Therefore, our final sample consists of 14,305 firm-year observations from 1,985 unique firms between 2006 and 2021.[8]

[8] Compared with the mandatory disclosure of CEO pay to median employee pay from 2017 in the US and from 2019 in the UK, Chinese listed firms were required to report the total compensations of each director and executive team member since 2006 (CSRC, 2005, 2016).

3.2 Measuring Labour Investment Efficiency

In this paper, we use abnormal net hiring to measure labour investment efficiency. Following Jung et al. (2014), abnormal net hiring is defined as the absolute deviation of actual net hiring from the expected net hiring activities. The expected net hiring is estimated using Model (1) based on certain firm characteristics that affect the company workforce employment (Khedmati et al., 2020; Pinnuck & Lillis, 2007; Sualihu et al., 2021a).

$$\begin{aligned} NET\_HIRE_{i,t} = {} & \beta_0 + \beta_1 RETURN_{i,t} + \beta_2 SIZE\_R_{i,t-1} + \beta_3 SALEGROWTH_{i,t-1} \\ & + \beta_4 SALEGROWTH_{i,t} + \beta_5 CHROA_{i,t} + \beta_6 CHROA_{i,t-1} + \beta_7 ROA_{i,t} \\ & + \beta_8 QUICK_{i,t-1} + \beta_9 CHQUICK_{i,t-1} + \beta_{10} CHQUICK_{i,t} + \beta_{11} LEV_{i,t-1} \\ & + \beta_{12} AUR_{i,t-1} + \beta_{13} LOSSBIN1_{i,t-1} + \beta_{14} LOSSBIN2_{i,t-1} \\ & + \beta_{15} LOSSBIN3_{i,t-1} + \beta_{16} LOSSBIN4_{i,t-1} + \beta_{17} LOSSBIN5_{i,t-1} \\ & + \sum YEAR + \sum INDUSTRY + \varepsilon_{i,t} \qquad (1), \end{aligned}$$

where $NET\_HIRE_{i,t}$ is the percentage change in the number of employees from year t-1 to year t for firm i. $RETURN_{i,t}$ is the annual stock return and proxies for future expected growth and the effect of any omitted fundamental variables. $SIZE\_R_{i,t-1}$ is the percentile rank of the logarithm of market value at the beginning of the year. $SALEGROWTH_{i,t-1}$ and $SALEGROWTH_{i,t}$ are the percentage changes in sales revenue in years t-1 and t, respectively. $CHROA_{i,t}$, $CHROA_{i,t-1}$, and $ROA_{i,t}$ are controlled for firm performance (measured as the ratio of net income to total assets) and changes in firm performance in years t-1 and t. We control for changes in employment due to liquidity problems by including quick ratios and their changes in years t-1 and t ($QUICK_{i,t-1}$, $CHQUICK_{i,t-1}$, and $CHQUICK_{i,t}$). The quick ratio is measured as the ratio of the sum of cash and short-term investments and receivables to current liabilities. $LEV_{i,t-1}$ is the measure of leverage, which proxies the firm's long-term financing requirements. It is measured by the total long-term debt scaled by total assets at the beginning of the year t. Asset turnover ratio ($AUR_{i,t-1}$), which is the total sales revenue divided by total assets at the beginning of the year t, is included to control the efficiency of using assets. Finally, we include five additional control variables to control for the loss-making status of a firm at year t-1. Specifically, $LOSSBIN1_{i,t-1}$ is equal to 1 if the prior-year ROA is between -0.005 to 0, $LOSSBIN2_{i,t-1}$ is equal to 2 if the prior-year ROA is between -0.005 to -0.010, $LOSSBIN3_{i,t-1}$ is equal to 3 if the prior-year ROA is between -0.010 to -0.015, $LOSSBIN4_{i,t-1}$ is equal to 4 if the prior-year ROA is between -0.015 to -0.020, $LOSSBIN5_{i,t-1}$ is equal to 5 if the prior-year ROA is between -0.020 to -0.025, and otherwise they are equal to zero. We also include China Securities Regulatory Commission (CSRC) 2-digit industry-fixed effects and year-fixed effects.

Any deviations (measured by the residuals in Model (1); $\varepsilon_{i,t}$) are considered abnormal net hiring and hence inefficient labour investment. Specifically, there are underinvestment activities if the residuals are negative, whereas there are overinvestment activities if the residuals are positive. We obtain the absolute value of the residuals from this estimation and label it as abnormal net hiring (*ABRESID*) and we use it as the dependent variable in our Model (2).

3.3 Regression Model

We use the following Ordinary Least Square (OLS) model to empirically examine the relationship between the pay gap and labour investment efficiency:

$$\begin{aligned} ABRESID_{i,t} = {} & \beta_0 + \beta_1 FPG_{i,t-1} + \beta_2 SIZE_{i,t-1} + \beta_3 ROA_{i,t-1} + \beta_4 LEV_{i,t-1} \\ & + \beta_5 SALESGROWTH_{i,t-1} + \beta_6 STD\_CFO_{i,t-1} + \beta_7 STD\_SALES_{i,t-1} \\ & + \beta_8 STD\_NETHIRE_{i,t-1} + \beta_9 LABOR\_INTENSITY_{i,t-1} \\ & + \beta_{10} PPE_{i,t-1} + \beta_{11} INSTI_{i,t-1} + \beta_{12} INDEP_{i,t-1} + \beta_{13} DUAL_{i,t-1} \\ & + \beta_{14} BDSIZE_{i,t-1} + \beta_{15} SOE_{i,t-1} + \sum YEAR + \sum INDUSTRY \\ & + \varepsilon_{i,t} \qquad (2), \end{aligned}$$

where $ABRESID_{i,t}$ is abnormal net hiring for firm i in year t (See Section 3.2). $FPG_{i,t-1}$ is the proxy of the executive-employee pay gap at the beginning of the year. Following Wang et al. (2023) and Dai et al. (2017), due to the right-skewed distribution of the raw pay ratios, we use the natural logarithm of the ratio of average executive pay to average employee pay to measure the executive-employee pay gap (*FPG*). If the tournament theory dominates in labour investment decisions, we expect to find a negative coefficient on $FPG_{i,t-1}$. If the comparison theories dominate in labour investment decisions, we expect to find a positive coefficient on $FPG_{i,t-1}$.

Following prior research (e.g., Habib & Hasan, 2021; Sualihu et al., 2021a), a number of control variables for firm characteristics are included in Model (2). Other than variables defined before in Model (1) (i.e., *ROA*, *LEV*, and *SALESGROWTH*), we control the firm size (*SIZE*), cash flow volatility (*STD_CFO*), sales volatility (*STD_SALES*), net hiring volatility (*STD_NETHIRE*), labour intensity (*LABOUR_INTENSITY*), tangible asset ratio (*PPE*), institutional shareholdings (*INSTI*), board independence (*INDEP*), CEO duality (*DUAL*), board size (*BDSIZE*) and state ownership (*SOE*). *SIZE* is measured as the natural logarithm of market value, *LABOUR_INTENSITY* is measured as the number of employees divided by total assets, *PPE* is the ratio of property, plant, and equipment to total assets, and *INSTI* is the percentage of institutional shareholdings. *STD_CFO*, *STD_SALES*, and *STD_NETHIRE* are measured as the standard deviation of cash flows from operations, sales revenues, and changes in the number of employees over a five-year window, respectively. Regarding corporate governance variables, *INDEP* is the proportion of independent directors on the board, *DUAL* is the coded 1 when the CEO serves also as the chairman of the board, and *BDSIZE* is the natural logarithm of the total number of directors. We include *SOE* in the model to account for the distinctive behaviour of Chinese SOEs compared to non-SOEs (Jiang & Kim, 2020; Lin et al., 2020). Table A1 presents the definitions of the variables employed in this study. To account for unobserved heterogeneity, the model is estimated with industry- and year-fixed effects. In addition, all standard errors are corrected for firm-level clustering. To mitigate the effect of outliers, all continuous variables are winsorized at the 1st and 99th percentiles.

4. RESULTS

4.1 Descriptive Statistics

Table 1 presents the descriptive statistics of the variables included in the regression model. The mean value of *ABRESID* is 0.124 over the sample period, which is comparable to Ding et al. (2021) and Kong et al. (2018) who also explore the labour investment decisions in Chinese firms. The mean and median values of *FPG*, are 1.617 and 1.592, respectively, and are closer to those of Xu et al. (2017). The average unlogged ratio of average executive pay to average employee pay is around 5:1. We also find that an average firm has an unlogged market value of 6.45 million CNY (*SIZE*; 15.68), has a moderate level of leverage (*LEV*; 0.428), is profitable (*ROA*; 0.047), and is fast-growing (*SALESGROWTH*; 0.153). On average, 37.3% of directors are independent (*INDEP*; 0.373) with a board with around 8 directors (*BDSIZE*; 2.135). The descriptive statistics of *STD_CFO*, *STD_SALE*S, and *LABOUR_INTENSITY* are adjusted for presentation following Kong et al. (2018). In addition, around 35% of sample firms are state-owned (*SOE*; 0.346).

[Insert Table 1 about here]

We also perform the Pearson correlation test and report the correlation matrix in Table A2. We find that *FPG* is significantly and negatively correlated with *ABRESID* at the 1% level, suggesting that a larger executive-employee pay gap leads to more efficient investment in labour. As for control variables, inefficient labour investment is positively associated with firm performance (*ROA*), sales revenue growth rate (*SALEGROWTH*), net hiring volatility (*STD_NETHIRE*) and CEO duality (*DUAL*), whereas it is negatively correlated with cash flow volatility (*STD_CFO*), sales volatility (*STD_SALES*), labour intensity (*LABOUR_INTENSITY*), tangible asset ratio (*PPE*) and board size (*BDSIZE*). The magnitudes of Pearson's correlations among independent variables are seldom greater than 0.70, with one exception (i.e., the correlation coefficient between *STD_CFO* and *STD_SALES* is 0.813), suggesting that there may have been multicollinearity concerns. We address this concern in the following section.

4.2 Baseline Regression Results

Column (1) of Table 2 reports the baseline regression results of Model (2). The coefficient for *FPG* is negative statistically significant at the 1% level ($\beta = -0.02$, $p < 0.01$). The finding implies that the labour investment efficiency is increased when the executive-employee pay gap becomes larger. We explain this finding as the executive-employee pay gap may reduce agency conflicts within the firm, which increases executives' willingness to control labour costs and make more effective labour investment decisions, and the pay gap provides strong incentives to employees to work hard to obtain higher positions and benefits in the firm, which encourages a stable and dynamic workplace and facilitating quicker labour adjustment when needed. In terms of economic significance, we find that a one-standard-deviation increase in *FPG* is associated with a 10.27% decline in labour investment inefficiency (-0.02*0.637/0.124). Thus, the positive association between the executive-employee pay gap and labour investment efficiency is both statistically and economically significant.

With regard to control variables, our results are consistent with prior studies (e.g., Cao & Rees, 2020; Khedmati et al., 2020; Le & Tran, 2022). For instance, we find that larger firms (*SIZE*; $\beta = 0.005$, $p < 0.01$) and fast-growing firms (*SALESGROWTH*; $\beta = 0.035$, $p < 0.01$) are more likely to overinvest due to blind optimism about the future. Firms with high volatilities of net hiring (*STD_NETHIRE*; $\beta = 0.010$, $p < 0.05$) have frequent labour adjustments, which may increase the burden of labour costs on the firm, hence, inefficient labour investment. A good corporate governance structure is also found to affect labour investment efficiency positively (i.e., *DUAL*; $\beta = 0.009$, $p < 0.01$ and *BDSIZE*; $\beta = -0.018$, $p < 0.05$, respectively). Firms with higher volatilities of sales face greater market uncertainty, so these firms will focus more on cost management and efficiency (*STD_SALES*; $\beta = -0.016$, $p < 0.05$). The R-square of the regression model is also similar to the existing literature, which indicates a goodness-of-fit comparable to that reported by studies using similar specifications (Liu et al., 2023; Wang et al., 2024; Yang et al., 2024). We also perform a Variance Inflation Factor (VIF) test to mitigate the multicollinearity concern in this paper. The results show that the VIF values of all variables are less than 5, indicating a low concern relating to multicollinearity.

4.3 Endogeneity Test Results

4.3.1 Firm Fixed Effects

Although this paper controls for year and industry-fixed effects, there may be time-invariant firm characteristics that can result in a spurious correlation between the executive-employee pay gap and labour investment efficiency. To address this issue, we re-estimated our Model (2) using a fixed effects panel regression with firm-level fixed effects, and report the results in Column (2) of Table 2. We continue finding similar results as those shown in Column (1) This indicates that the executive-employee pay gap still has a significantly positive effect on labour investment efficiency, even after accounting for time-invariant unobservable firm-specific factors.

4.3.2 Propensity Score Matching (PSM)

We adopt the PSM method to address the differences in observable variables between firms with a large executive-employee pay gap and firms with a small executive-employee pay gap (Shipman et al., 2017). Following Chowdhury et al. (2022), We divide our sample into two groups based on the median *FPG*. The high (low) *FPG* group is labelled based on the above (below) median *FPG*. We consider the groups with above (below) the median *FPG* as the treated (control) group. We match the firms from a treatment group having a high value of pay gap, with firms from a control group having a low value of pay gap. We employ all control variables in the main model as covariates, and perform one-to-one matching of the nearest neighbours within the calliper radius (0.01). Austin (2011) suggests that if there is no systematic difference in mean values between treated and untreated subjects, the PSM model is appropriately specified. As depicted in Table A3, all significant differences in the pooled sample disappear after implementing the PSM method. We re-estimate our Model (2) using the propensity-score matched sample. Column (3) of Table 2 reports the regression results for the matched sample. The coefficient of *FPG* is -0.017, significant at the 1% level, which is consistent with our main findings.

[Insert Table 2 about here]

4.3.3 Two-Stage-Least Square (2SLS) Estimation

While we document a positive association between the executive-employee pay gap and labour investment efficiency, it is possible that labour investment efficiency drives a large executive-employee pay gap. For example, since abnormal net hiring can have a negative impact on future firm performance (Jung et al., 2014), firms that invest more efficiently in labour will perform better, and executives will be rewarded more, which will further increase the executive-employee pay gap. Thus, we use an instrumental variable (IV) approach and estimate our model using a 2SLS framework. Following (Yang & Kong, 2019), we use the adjustment effect of personal income tax (i.e. *TAXEFFECT*) as an IV of the executive-employee pay gap. As an exogenous event, personal income tax will have an impact on individual after-tax pay. Since the personal income tax rate will only affect the after-tax income rather than the pre-tax income, we first need to transform our pre-tax pay gap measure (*FPG*) to the after-tax pay gap measure. To calculate the after-tax pay gap (*EFPG*), we first multiply the average compensation of executives and the average compensation of employees by the excess progressive tax rate multiplier. Second, we obtain the average after-tax compensation of executives and employees by subtracting the quick deductions. Third, we take a natural logarithm of the ratio of the after-tax compensation of executives and employees as the after-tax pay gap (*EFPG*). We use *EFPG* as a substitute variable for the pre-tax executive-employee pay gap (*FPG*) to re-estimate the baseline regression model. The result is presented in Column (1) of Table 3. The results show that the coefficient on *EFPG* is negative and significant, in line with our results using *FPG*. To a certain extent, the robustness of our main result is verified.

We use the tax rate of this year to adjust the average annual pay of executives and employees in the previous year respectively and obtain the virtual pay gap. Then, we use the tax rate of the previous year to adjust the average annual pay of executives and employees in the previous year respectively and obtain the real pay gap. Since the pay of the previous year will not be affected by the change in the tax rate of this year, the virtual pay gap minus the real pay gap is the net impact of the tax rate changes on the pay gap, which is called the tax effect (our IV; *TAXEFFECT*). This variable is correlated with the after-tax pay gap (*EFPG*) and satisfies the correlation requirement. Furthermore, since the variable only measures the effect of changes in personal income tax rates, it does not have an impact on labour investment efficiency, which satisfies the exogeneity requirement. Since one of the key objectives of personal income tax policy is to address the widening income gap (Xu & Cui, 2009), we expect *TAXEFFECT* to be negatively related to the *EFPG*. In the first stage, we regress *EFPG* on *TAXEFFECT* and other control variables included in Model (2). Our results in Column (2) of Table 3 show that the coefficient on *TAXEFFECT* is negative and significant at the 1% level, indicating that the tax effect can reduce the after-tax pay gap. In the second stage, we replaced *EFPG* with *PRE_EFPG* (the predicted value generated from the first stage). In Column (3), we find that the coefficient for *PRE_EFPG* is negative and statistically significant at the 5% level, suggesting that our results are robust when using the instrument variable approach. The weak instrument test reveals that the F value of the Cragg-Donald Wald test is 320.846, which is higher than the 10% critical value of 16.38, thus rejecting the weak instrument hypothesis.

[Insert Table 3 about here]

4.4 Robustness Checks

4.4.1 Alternative Measures of Executive-Employee Pay Gap

To enhance the robustness of our main regression results, we examine three alternative measures of the executive-employee pay gap that have been used in the prior studies (e.g., Han et al., 2022; Huang et al., 2022). *GAP1* is measured as the average management pay to the average employee pay, where management includes all executives, directors (except independent directors) and supervisors, and employees include all other employees. *GAP2* is the natural logarithm of the difference between the top-three executives' average compensation and the employee's average compensation. *GAP3* is the ratio of the top-three executives' average compensation to the employee's average compensation. Columns (1) to (3) of Table 4 report the results, which remain highly consistent with the findings of the main study.

4.4.2 Alternative Measures of Labour Investment Efficiency

We also consider two alternative measures of expected net hiring. First, executives often behave like their industry peers when it comes to making investment decisions (Sualihu et al., 2021a). Therefore, any deviations from the industry median labour investment can be captured as inefficient labour investment. Thus, we use *Industry_Adjusted ABRESID* as our first alternative measure of labour investment efficiency, which is measured as the absolute value of deviations between actual net hiring (*NET_HIRE*) and median net hiring in each industry-year pair. The more a firm's net hiring deviates from its industry peers, the larger the measure of abnormal net hiring. Second, firms experiencing greater sales growth are more likely to hire employees to increase their production or service provision. In contrast, firms having lower sales growth are less likely to hire employees. Therefore, following Jung et al. (2014), we use $SALEGROWTH_{i,t-1}$ as the sole independent variable in Model (1), and re-estimate our labour investment efficiency measure, *ABRESID2*. We replace *ABRESID* with these two alternative measures of labour investment efficiency and re-run Model (2), and report the results in Columns (4) and (5) of Table 4. We still find negative associations between the executive-employee pay gap and labour investment inefficiency, implying that our results are robust across various proxies for abnormal net hiring.

4.4.3 Excluding Alternative Explanations

In this section, we perform some tests to rule out alternative explanations of our research findings. Firstly, the improvement in labour investment efficiency may not be caused by the executive-employee pay gap, but rather by the external pay gap (Chowdhury et al., 2022). When the external pay gap is large, executives improve corporate governance and adopt more efficient labour investment decisions in order to increase their value in the labour market. To eliminate this alternative explanation, adapting from Chowdhury et al. (2022), we use the natural logarithm of the difference between the average compensation of the second-highest-paid executives of the same CSRC industry group and that of the focal firm's executives as the proxy for the external pay gap. We then include it as an additional control variable (*INDCOM*) in Model (2) and re-run the regression. A negative and marginally significant coefficient on *INDCOM* (β = -0.017, $p < 0.1$) shown in Column (6) of Table 4 supports that the executives' external incentives also induce efficient labour investment. More importantly, the coefficient of *FPG* remains significantly negative after controlling the external pay gap, further supporting our main findings.

Secondly, the application of industrial robots may also affect the labour investment efficiency in firms (Acemoglu & Restrepo, 2020). The application of industrial robots will shift the human capital structure in a firm (Humlum, 2019). It also slows employment growth and reduces the unit labour cost resulting from increased labour productivity (Jung & Lim, 2020). Thus, the application of industrial robots may introduce some noises in the measurement of labour investment efficiency. To eliminate this alternative explanation, we introduce an additional variable, the robotic penetration rate (*IFR*), in our research design. Referring to Duan et al. (2023), we use *IFR* as a proxy variable for industrial robot applications. We use the following steps to calculate *IFR*.

The first step was to calculate the industry-level index of industrial robot penetration rate, denoted as PR_{it}^{CH}:

$$PR_{i,t}^{CH} = \frac{MR_{i,t}^{CH}}{L_{i,t=2010}^{CH}} \qquad (3),$$

where MR_{it}^{CH} represents the stock of industrial robots in the industry i in year t, $L_{i,t=2010}^{CH}$ represents the employment population in the industry i in 2010 (base period), and PR_{it}^{CH} represents the industrial robot penetration rate in the industry i in year t.

The second step involved constructing the firm-level index of industrial robot penetration rate (*IFR*).

$$CHF\ exposure\ to\ robots_{jit} = \frac{PWP_{j,i,t=2011}}{ManuPWP_{t=2011}} * \frac{MR_{i,t}^{CH}}{L_{i,t=2010}^{CH}} \qquad (4)$$

This indicator measures the *IFR* of firm j in industry i in year t. Where $\frac{PWP_{j,i,t=2011}}{ManuPWP_{t=2011}}$ represents the ratio of the proportion of production department employees in industry i in 2011 (base period) to the median proportion of all manufacturing firms' production department employees in 2011.

After calculating the *IFR*, we used two ways to check the robustness of our main findings. First, we include it as an additional control variable in our Model (2) and report the regression results in Column (7) of Table 4. Second, since the industrial robot may affect labour employment, we include it as one of the determinants of *NET_HIRE* in Model (1) and re-estimate the abnormal net hiring (i.e., *ABRESID3*). We rerun Model (2) using *ABRESID3* as the dependent variable and show the results in Column (8) of Table 4.[9] We still find significantly negative coefficients of *FPG* in both Columns (7) and Column (8), which is in line with our main results. Overall, these findings suggest that, after eliminating the influence of the external pay gap and industrial robot applications, the executive-employee pay gap still has a significant positive effect on labour investment efficiency, with the main research conclusions remaining unchanged.

[Insert Table 4 about here]

Thirdly, labour investment usually complements other investments (Jung et al., 2014; Sualihu et al., 2021b). Thus, labour investment is likely to be positively correlated with other types of investment, such as capital expenditures, R&D expenditures, advertising expenditures and acquisition expenditures. If labour investment is a manifestation of other investments, our study cannot differentiate itself from previous results related to the efficiency of capital investment. To rule out this alternative explanation, we divide the sample into three subsamples based on the link between net hiring and specific investments (Khedmati et al., 2020; Sualihu et al., 2021b). We measure the investment in other types of investments as the percentage change of other investments from year t-1 to t. If a firm has both net hiring and other investments and is in the same direction (two increases or decreases), we consider those two investments to have a positive relationship. If, instead, a firm has net both hiring and other investments but are in different directions (one increase and one decrease), we consider those two investments to have a negative relationship. If a firm only has net hiring, but

[9] In the untabulated results, the application of industrial robots is significantly and negatively associated with the firm's workforce employment decisions.

reports zero or missing value of other investments, we consider those two investments to have no relationship. Accordingly, we label these subsamples as *Positive*, *Negative*, and *Zero*. We then estimate Model (2) separately for each of these subsamples and report the regression results in Table 5.

If our main results are driven by non-labour investments, we expect our results to be concentrated in the *Positive* subsamples. We find the coefficients on *FPG* are consistently negative and statistically significant at the 1% level not only in *Positive* samples but also in *Negative* and *Zero* subsamples. Thus, the main results in Table 2 are not driven by non-labour investments.

[Insert Table 5 about here]

5. CHANNEL ANALYSIS

In previous sections, we find that the executive-employee pay gap significantly contributes to promoting labour investment efficiency. The possible channels through which the executive-employee pay gap affects labour investment efficiency have been unexplored so far. The beneficial effect of the pay gap is grounded on one possible way that may explain the association between the pay gap and labour investment: the agency costs. In this section, we use a two-step approach for the mediation test to avoid possible endogeneity problems associated with stepwise regression methods.[10]

The existing literature shows that self-interested managers for the sake of their private interests will make firms deviate from optimal labour investments (Chowdhury et al., 2022; Habib & Ranasinghe, 2022; Jung et al., 2014). The tournament theory believes that the pay gap can motivate employees to work hard. In the case of generally high corporate supervision costs, the pay gap can reduce agency and supervision costs (Lazear & Rosen, 1981). Thus, we argue that the agency cost could be a possible channel. According to Ang et al. (2000), we use the management expense ratio (*AGENT*) as our first measure of agency cost. The higher the management expense ratio, the greater the agency cost. Moreover, following Luo et al. (2011), we use Model (5) to isolate abnormal management costs, that is, executive perquisites (*UNPERK*) and use it as our second measure of agency cost.

[10] In untabulated tests, we also perform the mediation tests using stepwise regressions, and the results do not change much.

$$\frac{Perk_{i,t}}{ASSETS_{i,t-1}} = \beta_0 + \beta_1 * \frac{1}{ASSETS_{i,t-1}} + \beta_2 * \frac{\Delta SALE_{i,t}}{ASSETS_{i,t-1}} + \beta_3 * \frac{NPPE_{i,t}}{ASSETS_{i,t-1}} + \beta_4 * \frac{INV_{i,t}}{ASSETS_{i,t-1}} + \beta_5 * LNEMPLOYEE_{i,t} + \varepsilon_{i,t} \quad (5),$$

where $Perk_{i,t}$ is management expenses excluding bad debt expenses, unrealized holding gain or loss for inventory if any, and direct compensation for directors and top executives. $ASSETS_{i,t-1}$ is total assets at the beginning of the year. $\Delta SALE_{i,t}$ is the change in sales revenue. $NPPE_{i,t}$ is the net value of property, plant, and equipment. $INV_{i,t}$ is the total inventory. $LNEMPLOYEE_{i,t}$ is the natural logarithm of the number of employees. We obtain the residuals by running regressions using Model (5) on all observations by year and industry to measure *UNPERK*.

We then examine the impact of the executive-employee pay gap (*FPG*) on both measures of agency cost and report the results in Columns (1) and (2) for *AGENT* and *UNPERK*, respectively. As expected, we find negative and significant coefficients on *AGENT* (β = -0.003; $p < 0.05$) and *UNPERK* (β = -0.002; $p < 0.01$, suggesting that the executive-employee pay gap can significantly reduce agency costs. Overall, our results support that the executive-employee pay gap could improve labour investment efficiency by reducing agency costs.

[Insert Table 6 about here]

6. ADDITIONAL ANALYSIS

6.1 The Role of Employee Stock Ownership Plans

In Section 5.1, we find that the reduced agency cost could be a possible channel through which the executive-employee pay gap can increase labour investment efficiency. Given that the implementation of the employee stock ownership plan reduces agency costs (Hochberg & Lindsey, 2010), we may find a substitution effect of the employee stock ownership plan for the executive-employee pay gap. The introduction of employee stock ownership plans changes the role of employees to the shareholders/owners of the company. This shift in identity perception, on the one hand, promotes non-executive employees to play a supervisory function and constrain the self-interested behaviour of executives, and on the other hand, helps enhance employee productivity (Clark et al., 1997; Hochberg & Lindsey, 2010). Thus, the labour investment efficiency could be higher regardless of the level of the executive-employee pay gap when there is an employee stock ownership plan. Therefore, we expect the enhancing effect of the executive-employee pay gap on labour investment efficiency to be weakened in firms that implement employee stock ownership plans.

Following, Kong et al. (2024), a dummy variable, *ESOP*, is used to measure the existence of an employee stock ownership plan in this section. It equals one if the firm has adopted employee stock ownership plans in a given year and zero otherwise. We also introduce an interaction between *FPG* and *ESOP* to investigate the moderation effects of the employee stock ownership plans. Based on our discussion above, we expect a significantly negative coefficient on *ESOP* and a significantly positive coefficient on the interaction term (*FPG**ESOP*). The regression results are presented in Table 7. The significantly negative coefficient on *ESOP* ($\beta = -0.041$, $p < 0.01$) suggests that the existence of employee stock ownership plans will reduce (increase) labour investment inefficiency (efficiency). More importantly, the coefficient on *FPG**ESOP* is positive and significant at the 1% level, supporting our expectation that employee stock ownership plans can substitute for a portion of the effect of the executive-employee pay gap, making it less effective in enhancing labour investment efficiency in firms with employee stock ownership plans.

[Insert Table 7 about here]

6.2 Over-Investment versus Under-Investment

In previous sections, we considered both positive and negative deviations from the expected net hiring as inefficient labour investment. In this subsection, we extend our analyses by separately examining the relationship between the executive-employee pay gap and over-investment (positive abnormal net hiring) and under-investment (negative abnormal net hiring). On the one hand, executives may engage in empire-building activities or exaggerate performance, leading to over-investment in labour when the economic fundamentals do not support it. On the other hand, executives may under-invest in labour to meet performance targets or because they are unable to motivate employees. Through the decreased agency costs, we believe that the executive-employee pay gap can reduce both types of inefficient labour investment behaviours. Therefore, we expect that the coefficients on *FPG* should be significantly negative in both the overinvestment and underinvestment subgroups. We report the regression results of Model (2) in Column (1) of Table 8 for the overinvestment subsample, and in

Column (4) of Table 8 for the underinvestment subsample. Supporting our expectations, the coefficients of *FPG* are negative and statistically significant at the 5% level or better.

Furthermore, firms are likely to respond to different economic conditions by either increasing or reducing production (Sualihu et al., 2021a). During periods of economic growth, more employees are likely to be hired because the demand for goods and services is expected to increase, while during periods of economic downturns, firms are less likely to hire employees because the demand for goods and services is likely to decrease (Khedmati et al., 2020; Sualihu et al., 2021b). Thus, we further explore the employment decisions made by the executive in firms with different growth opportunities. We use the expected net hiring generated from Model (1) to proxy for growth opportunities. Specifically, if a firm has a positive expected net hiring, we assume that it has a good economic condition. However, if a firm has a negative expected net hiring, we assume that it has a bad economic condition. Based on the association between abnormal net hiring and expected net hiring, we further classify our observations into four categories. In the periods with good economic conditions, the *over-hiring* and the *under-hiring* subsamples represent over-investment and under-investment subsamples, respectively. In the periods with bad economic conditions, the *under-firing* and the *over-firing* subsamples represent over-investment and under-investment subsamples, respectively.

Our main results suggest that the executives will make efficient labour investment decisions when the executive-employee pay gap is high. Thus, we expect such effects to exist regardless of the firms' economic conditions. We estimate Model (2) separately for each subsample and report the results in Columns (2), (3), (5) and (6) of Table 8. The coefficients on *FPG* in Columns (2) and (5) suggest that the executive-employee pay gap induces more efficient hiring decisions during periods of economic growth, which is consistent with our main results. The coefficients on *FPG* in Columns (3) and (6) suggest that the under-firing activities can be constrained by the executive-employee pay gap during periods of economic downturn, but not for the over-firing activities. Although the executives can make more efficient labour investments in periods of economic downturn, the overall direction is to fire more employees to pull through. These results provide additional insight into the associations between the executive-employee pay gap and labour investment efficiency.

[Insert Table 8 about here]

6.3 Labour Cost Stickiness

In the previous sections, we measured the labour investment efficiency using the changes in the number of employees. In this subsection, we explore the relationship between the executive-employee pay gap and monetary-related labour investments, which is labour cost stickiness. Anderson et al. (2003) argue that the costs are sticky when they increase more when the level of an activity rises than they decrease when the level of this activity falls. Prior studies also confirm and explore the existence and determinants of labour cost stickiness (Ibrahim et al., 2022; Prabowo et al., 2018). Since the cost stickiness increases with the agency problems (e.g., Chen et al., 2012) and we find that the executive-employee pay gap can reduce agency cost, we expect firms with higher executive-employee pay gap to show lower labour cost stickiness. According to Prabowo et al. (2018) and Le and Ouyang (2023), we use the following model to test our expectations:

$$Ln\left(LabCost_{i,t}/LabCost_{i,t-1}\right) = \beta_0 + \beta_1 Ln\left(Rev_{i,t}/Rev_{i,t-1}\right) + \beta_2 Decr_{i,t} \times Ln\left(Rev_{i,t}/Rev_{i,t-1}\right) + \beta_3 Decr_{i,t} \times Ln\left(Rev_{i,t}/Rev_{i,t-1}\right) \times FPG_{i,t} + \beta_4 Decr_{i,t} \times Ln\left(Rev_{i,t}/Rev_{i,t-1}\right) \times Controls_{i,t} + \beta_5 FPG_{i,t} + \beta_6 Controls_{i,t} + \sum YEAR + \sum INDUSTRY + \varepsilon_{i,t} \quad (6),$$

where $Ln\left(LabCost_{i,t}/LabCost_{i,t-1}\right)$ represents the natural logarithm of changes in labour costs, including wages, salaries, and other benefits paid to employees. *Rev* is the total revenue; *Decr* is a dummy variable equal to one if the total revenue decreased from the previous year and zero otherwise; *FPG* is our main proxy for the executive-employee pay gap. We include three control variables in Model (6): *AI* is the asset intensity, measured as the ratio of total assets to total revenue; *Suc_Decr* is a dummy variable, coded as one if a firm's revenue decreased for two consecutive years and zero otherwise; *LOSS* is an indicator variable, which takes the value of 1 for firms with negative *ROA* in the current year and zero otherwise. Table 9 provides the estimation results. The significantly positive coefficient on $Ln\left(Rev_{i,t}/Rev_{i,t-1}\right)$ and significantly negative coefficient on $Decr_{i,t} \times Ln\left(Rev_{i,t}/Rev_{i,t-1}\right)$ confirm the existence of labour cost stickiness. The coefficient on $Decr_{i,t} \times Ln\left(Rev_{i,t}/Rev_{i,t-1}\right) \times FPG_{i,t}$ is significantly positive, implying that the executive-employee pay gap decreases labour cost stickiness. Overall, this additional analysis shows that the executive-employee pay gap has a beneficial effect not only on the number of employees but also on their wages and salaries, thus contributing to the efficiency of labour investment. Moreover, it also confirms that the link between the executive-employee pay gap and labour investment efficiency is not driven by specific measurements of labour investment.

[Insert Table 9 about here]

7. CONCLUSIONS

In this study, we investigate how the executive-employee pay gap impacts labour investment efficiency. Our findings demonstrate that a larger pay gap enhances labour investment efficiency, a result robust to endogeneity tests, alternative measures of the pay gap and labour efficiency, and various explanations. The reduced agency costs could be a possible channel through which the pay gap can increase efficient labour investment. Additionally, employee stock ownership plans substitute for the pay gap's effects. While the pay gap improves labour investment efficiency during both economic growth and downturns, firms still engage in over-firing during downturns, indicating a focus on reducing labour costs to survive. Moreover, we find that a higher pay gap significantly reduces labour cost stickiness. These findings contribute to the growing literature on the economic consequences of the executive-employee pay gap and its relationship with labour investment efficiency.

Our study provides important insights for both corporate managers and policymakers. The findings suggest that maintaining a larger executive-employee pay gap can enhance labour investment efficiency, which is crucial for firms aiming to optimize their workforce allocation. However, firms should be cautious during economic downturns, as over-firing remains a prevalent strategy, highlighting the need for better crisis management practices that do not solely rely on labour cost reductions. For corporate managers, the implementation of employee stock ownership plans can effectively substitute for the pay gap's effects, promoting a more balanced approach to labour investment. This can lead to a more engaged and productive workforce, ultimately benefiting the firm’s overall performance.

Policymakers should consider these dynamics when designing regulations around executive compensation and labour practices. Encouraging transparency and fairness in pay structures can foster a more efficient allocation of labour resources, supporting long-term sustainable development. Additionally, policies that incentivize employee stock ownership plans may help mitigate the adverse effects of large pay gaps, promoting equity and stability in the labour market. Overall, our findings underscore the importance of strategic pay structure design in achieving optimal labour investment efficiency, which is essential for the enduring success and resilience of firms.

REFERENCES

Acemoglu, D., & Restrepo, P. (2020). Robots and jobs: Evidence from US labor markets. *Journal of Political Economy*, *128*(6), 2188-2244.

Adams, J. S. (1965). Inequity in social exchange. *Advances in Experimental Social Psychology*, *2*, 267-299.

Akerlof, G. A., & Yellen, J. L. (1990). The fair wage-effort hypothesis and unemployment. *The Quarterly Journal of Economics*, *105*(2), 255-283.

Anderson, M. C., Banker, R. D., & Janakiraman, S. N. (2003). Are selling, general, and administrative costs “sticky”? *Journal of Accounting Research*, *41*(1), 47-63.

Ang, J. S., Cole, R. A., & Lin, J. W. (2000). Agency costs and ownership structure. *The Journal of Finance*, *55*(1), 81-106.

Arvidsson, S., Eierle, B., & Hartlieb, S. (2022). Job satisfaction and investment efficiency–Evidence from crowdsourced employer reviews. *European Management Journal*, *42*(2), 266-280.

Austin, P. C. (2011). An introduction to propensity score methods for reducing the effects of confounding in observational studies. *Multivariate Behavioral Research*, *46*(3), 399-424.

Bai, M., Fu, Y., & Sun, M. (2023). Corporate diversification and labor investment efficiency: Evidence from China. *Economic Modelling*, *127*, 106482.

Banker, R. D., Bu, D., & Mehta, M. N. (2016). Pay gap and performance in China. *Abacus*, *52*(3), 501-531.

Ben-Nasr, H., & Alshwer, A. A. (2016). Does stock price informativeness affect labor investment efficiency? *Journal of Corporate Finance*, *38*, 249-271.

Bolino, M. C., & Turnley, W. H. (2008). Old faces, new places: Equity theory in cross-cultural contexts. *Journal of Organizational Behavior*, *29*(1), 29-50.

Burns, N., Minnick, K., & Starks, L. (2017). CEO tournaments: A cross-country analysis of causes, cultural influences, and consequences. *Journal of Financial and Quantitative Analysis*, *52*(2), 519-551.

Cao, Z., & Rees, W. (2020). Do employee-friendly firms invest more efficiently? Evidence from labor investment efficiency. *Journal of Corporate Finance*, *65*, 101744.

Cao, Z., Rees, W., & Zhang, Z. (2023). The effect of real earnings smoothing on corporate labour investment. *The British Accounting Review*, *55*(6), 101178.

Chen, C. X., Lu, H., & Sougiannis, T. (2012). The agency problem, corporate governance, and the asymmetrical behavior of selling, general, and administrative costs. *Contemporary Accounting Research*, *29*(1), 252-282.

Chen, C. X., & Sandino, T. (2012). Can wages buy honesty? The relationship between relative wages and employee theft. *Journal of Accounting Research*, *50*(4), 967-1000.

Chinese Securities Regulatory Commission (CSRC). (2005). Guidelines on contents and formats of information disclosure of annual report for listed companies—2005 version. *China Securities Regulatory Commission*.

Chinese Securities Regulatory Commission (CSRC). (2016). Guidelines on contents and formats of information disclosure of annual report for listed companies—2016 version. *China Securities Regulatory Commission*.

Chowdhury, H., Hossain, A., Tan, K., & Zheng, J. (2022). Do external labor market incentives improve labor investment efficiency? *Journal of Behavioral and Experimental Finance*, *34*, 100648.

Clark, A. E., Kristensen, N., & Westergård-Nielsen, N. (2009). Job satisfaction and co-worker wages: Status or signal? *The Economic Journal*, *119*(536), 430-447.

Clark, R. W., Philippatos, G. C., & Shrieves, R. E. (1997). Employee stock ownership plans and corporate control. *Managerial Finance*, *23*(3), 19-38.

Coles, J. L., Li, Z., & Wang, A. Y. (2018). Industry tournament incentives. *The Review of Financial Studies*, *31*(4), 1418-1459.

Connelly, B. L., Haynes, K. T., Tihanyi, L., Gamache, D. L., & Devers, C. E. (2016). Minding the gap: Antecedents and consequences of top management-to-worker pay dispersion. *Journal of Management*, *42*(4), 862-885.

Connelly, B. L., Tihanyi, L., Crook, T. R., & Gangloff, K. A. (2014). Tournament theory: Thirty years of contests and competitions. *Journal of Management*, *40*(1), 16-47.

Cowherd, D. M., & Levine, D. I. (1992). Product quality and pay equity between lower-level employees and top management: An investigation of distributive justice theory. *Administrative Science Quarterly*, *37*(2), 302-320.

Cronqvist, H., Heyman, F., Nilsson, M., Svaleryd, H., & Vlachos, J. (2009). Do entrenched managers pay their workers more? *The Journal of Finance*, *64*(1), 309-339.

Cullen, Z., & Perez-Truglia, R. (2022). How much does your boss make? The effects of salary comparisons. *Journal of Political Economy*, *130*(3), 766-822.

Dai, Y., Kong, D., & Xu, J. (2017). Does fairness breed efficiency? Pay gap and firm productivity in China. *International Review of Economics & Finance*, *48*, 406-422.

Ding, H., Ni, X., & Xu, H. (2021). Short selling and labor investment efficiency: Evidence from the Chinese stock market. *Accounting & Finance*, *61*(S1), 2451-2476.

Duan, D., Chen, S., Feng, Z., & Li, J. (2023). Industrial robots and firm productivity. *Structural Change and Economic Dynamics*, *67*, 388-406.

Fan, R., Pan, J., Yu, M., & Gao, H. (2022). Corporate governance of controlling shareholders and labor employment decisions: Evidence from a parent board reform in China. *Economic Modelling*, *108*, 105753.

Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, *7*(2), 117-140.

Firth, M., Leung, T. Y., Rui, O. M., & Na, C. (2015). Relative pay and its effects on firm efficiency in a transitional economy. *Journal of Economic Behavior & Organization*, *110*, 59-77.

Gao, Y., & Xu, J. (2023). Bank competition and firm labor investment efficiency: Evidence from China. *Emerging Markets Finance and Trade*, *59*(7), 2283-2297.

Ghaly, M., Dang, V. A., & Stathopoulos, K. (2020). Institutional investors' horizons and corporate employment decisions. *Journal of Corporate Finance*, *64*, 101634.

Gu, L., Ni, X., & Tian, G. (2022). Controlling shareholder expropriation and labor investment efficiency. *International Review of Economics & Finance*, *82*, 261-274.

Gu, Z., Tang, S., & Wu, D. (2020). The political economy of labor employment decisions: Evidence from China. *Management Science*, *66*(10), 4703-4725.

Guo, J., Tang, Q., & Jin, G. (2021). Labor protection and the efficiency of human capital investment. *Economic Analysis and Policy*, *69*, 195-207.

Habib, A., & Hasan, M. M. (2021). Business strategy and labor investment efficiency. *International Review of Finance*, *21*(1), 58-96.

Habib, A., & Ranasinghe, D. (2022). Labor investment efficiency and credit ratings. *Finance Research Letters*, *48*, 102924.

Han, X., Xu, H., Zhang, C., Shen, Y., & Lu, X. (2022). Will the narrowing pay gap in Chinese state-owned enterprises improve internal control quality? *Emerging Markets Finance and Trade*, *58*(12), 3340-3354.

Hochberg, Y. V., & Lindsey, L. (2010). Incentives, targeting, and firm performance: An analysis of non-executive stock options. *The Review of Financial Studies*, *23*(11), 4148-4186.

Hofstede, G. (1980). Culture and organizations. *International Studies of Management & Organization*, *10*(4), 15-41.

Huang, H., Yu, L., & Zhang, J. (2022). Mandatory CSR disclosure and pay gap: Evidence from China. *Emerging Markets Finance and Trade*, *58*(13), 3781-3812.

Humlum, A. (2019). *Robot adoption and labor market dynamics*. Working paper.

Ibrahim, A. E. A., Ali, H., & Aboelkheir, H. (2022). Cost stickiness: A systematic literature review of 27 years of research and a future research agenda. *Journal of International Accounting, Auditing and Taxation*, *46*, 100439.

Jiang, G., Lee, C. M., & Yue, H. (2010). Tunneling through intercorporate loans: The China experience. *Journal of Financial Economics*, *98*(1), 1-20.

Jiang, F., & Kim, K. A. (2020). Corporate governance in China: A survey. *Review of Finance*, *24*(4), 733-772.

Jiao, A., Sun, R., & Liu, C. (2024). Restricting pay gap backfires: The case of bank misconduct.

Finance Research Letters, *61*, 104981.
Jung, B., Lee, W. J., & Weber, D. P. (2014). Financial reporting quality and labor investment efficiency. *Contemporary Accounting Research, 31*(4), 1047-1076.
Jung, J. H., & Lim, D.-G. (2020). Industrial robots, employment growth, and labor cost: A simultaneous equation analysis. *Technological Forecasting and Social Change*, *159*, 120202.
Kale, J. R., Reis, E., & Venkateswaran, A. (2009). Rank-order tournaments and incentive alignment: The effect on firm performance. *The Journal of Finance*, *64*(3), 1479-1512.
Khedmati, M., Sualihu, M. A., & Yawson, A. (2020). CEO-director ties and labor investment efficiency. *Journal of Corporate Finance*, *65*, 101492.
Kong, D., Liu, J., Wang, Y., & Zhu, L. (2024). Employee stock ownership plans and corporate environmental engagement. *Journal of Business Ethics*, *189*(1), 177-199.
Kong, D., Liu, S., & Xiang, J. (2018). Political promotion and labor investment efficiency. *China Economic Review*, *50*, 273-293.
Kuang, Y. F., Qin, B., & Yang, X. (2024). Vertical pay disparity, traditional Chinese culture, and employee productivity. *Management Accounting Research*, 100902.
Lai, S., Chen, L., Wang, Q. S., & Anderson, H. D. (2023). Bank competition and corporate employment: Evidence from the geographic distribution of bank branches in China. *Journal of Banking & Finance*, *154*, 106964.
Lai, S., Li, X., Liu, S., & Wang, Q. S. (2022). Institutional investors’ site visits and corporate employment decision-making. *Journal of Contemporary Accounting & Economics*, *18*(3), 100332.
Lazear, E. P. (2018). Compensation and incentives in the workplace. *Journal of Economic Perspectives*, *32*(3), 195-214.
Lazear, E. P., & Rosen, S. (1981). Rank-order tournaments as optimum labor contracts. *Journal of Political Economy*, *89*(5), 841-864.
Lazear, E. P., & Rosen, S. (1987). Pension inequality. In Z. Bodie, J. B. Shoven, & D. A. Wise (Eds.), *Issues in Pension Economics* (pp. 341-364). University of Chicago Press.
Le, A.-T., & Ouyang, P. (2023). The dark side of asset redeployability through the lens of corporate employment decisions. *Journal of Corporate Finance*, *82*, 102462.
Le, A. T., & Tran, T. P. (2022). Corporate governance and labor investment efficiency: International evidence from board reforms. *Corporate Governance: An International Review*, *30*(5), 555-583.
Lee, K. Y. K., & Mo, K. (2020). Do analysts improve labor investment efficiency? *Journal of Contemporary Accounting & Economics*, *16*(3), 100213.
Li, W., Rong, M., & Wu, J. (2023). Does executives’ overseas experience improve firms’ labor investment efficiency? *China Journal of Accounting Research*, *16*(4), 100332.
Li, W., & Wu, C. (2023). Government Intervention and Labor Investment Efficiency: Evidence from China’s Industrial Policy. *Emerging Markets Finance and Trade*, *59*(5), 1487-1497.
Liu, J., Li, T., & Wang, L. (2023). Media coverage and labor investment efficiency: Evidence from China. *Asia-Pacific Journal of Financial Studies*, *52*(1), 116-152.
Lin, K. J., Lu, X., Zhang, J., & Zheng, Y. (2020). State-owned enterprises in China: A review of 40 years of research and practice. *China Journal of Accounting Research*, *13*(1), 31-55.
Luo, J.-h., Xiang, Y., & Zhu, R. (2020). When are pay gaps good or bad for firm performance? Evidence from China. *Management and Organization Review*, *16*(5), 1030-1056.
Luo, W., Zhang, Y., & Zhu, N. (2011). Bank ownership and executive perquisites: New evidence from an emerging market. *Journal of Corporate Finance*, *17*(2), 352-370.
Ma, M., Pan, J., & Stubben, S. R. (2020). The effect of local tournament incentives on firms' performance, risk-taking decisions, and financial reporting decisions. *The Accounting Review*, *95*(2), 283-309.
Martin, J. (1979). Relative deprivation: A theory of distributive injustice for an era of shrinking resources. *Research in Organizational Behavior*, *3*, 53-107.

Mueller, H. M., Ouimet, P. P., & Simintzi, E. (2017). Within-firm pay inequality. *The Review of Financial Studies*, *30*(10), 3605-3635.
Paycor. (2022). *Workforce Management: The biggest cost of doing business: A closer look at labor costs.* https://www.paycor.com/resource-center/articles/closer-look-at-labor-costs/
Pfeffer, J. (1994). Competitive advantage through people. *California Management Review*, *36*(2), 9-28.
Phan, H. V., Simpson, T., & Nguyen, H. T. (2017). Tournament-based incentives, corporate cash holdings, and the value of cash. *Journal of Financial and Quantitative Analysis*, *52*(4), 1519-1550.
Phelps Brown, E. H. (1979). *The inequality of pay*. Oxford: Oxford University Press.
Pinnuck, M., & Lillis, A. M. (2007). Profits versus losses: Does reporting an accounting loss act as a heuristic trigger to exercise the abandonment option and divest employees? *The Acounting Rview*, *82*(4), 1031-1053.
Prabowo, R., Hooghiemstra, R., & Van Veen-Dirks, P. (2018). State ownership, socio-political factors, and labor cost stickiness. *European Accounting Review*, *27*(4), 771-796.
Rajgopal, S., & Srinivasan, S. (2006). *Pay dispersion in the executive suite*. Working paper.
Rosen, S. (1986). Prizes and incentives in elimination tournaments. *The American Economic Review*, *76*(4), 701-715.
Schwartz, S. H. (1999). A theory of cultural values and some implications for work. *Applied Psychology: An International Review*, *48*(1), 23-47.
Shaw, J. D., & Gupta, N. (2007). Pay system characteristics and quit patterns of good, average, and poor performers. *Personnel Psychology*, *60*(4), 903-928.
Shipman, J. E., Swanquist, Q. T., & Whited, R. L. (2017). Propensity score matching in accounting research. *The Accounting Review*, *92*(1), 213-244.
Siegel, P. A., & Hambrick, D. C. (2005). Pay disparities within top management groups: Evidence of harmful effects on performance of high-technology firms. *Organization Science*, *16*(3), 259-274.
State Council. (2014). *State council's meeting on reviewing and passing a resolution of state-owned enterprises executive compensation*. http://www.gov.cn/xinwen/2014-08/29/content_2742373. htm
Stein, J. C. (2003). Agency, information and corporate investment. *Handbook of the Economics of Finance*, *1*(A), 111-165.
Sualihu, M. A., Rankin, M., & Haman, J. (2021a). The role of equity compensation in reducing inefficient investment in labor. *Journal of Corporate Finance*, *66*, 101788.
Sualihu, M. A., Yawson, A., & Yusoff, I. (2021b). Do analysts'’forecast properties deter suboptimal labor investment decisions? Evidence from Regulation Fair Disclosure. *Journal of Corporate Finance*, *69*, 101995.
Sun, S. L., & Habib, A. (2020). Determinants and consequences of tournament incentives: A survey of the literature in accounting and finance. *Research in International Business and Finance*, *54*, 101256.
Sun, S. L., Habib, A., & Huang, H. J. (2019). Tournament incentives and stock price crash risk: Evidence from China. *Pacific-Basin Finance Journal*, *54*, 93-117.
Vieito, J. P. T. (2012). Gender, top management compensation gap, and company performance: Tournament versus behavioral theory. *Corporate Governance: An International Review*, *20*(1), 46-63.
Wade, J. B., O'Reilly III, C. A., & Pollock, T. G. (2006). Overpaid CEOs and underpaid managers: Fairness and executive compensation. *Organization Science*, *17*(5), 527-544.
Wang, K., Zhou, K. Z., & Bai, X. (2023). Buddhist influence and the executive-employee pay gap: An institutional contingency framework. *Journal of Business Research*, *166*, 114091.
Wang, Q. S., Lai, S., Pi, S., & Anderson, H. (2022). Does directors' and officers' liability insurance induce empire building? Evidence from corporate labor investment. *Pacific-Basin Finance Journal*, *73*, 101753.
Wang, S., Wen, W., Niu, Y., & Li, X. (2024). Digital transformation and corporate labor

investment efficiency. *Emerging Markets Review*, *59*, 101109.
Xu, H., & Cui, H. (2009). Personal income tax policy in China and the United States: A comparative analysis. *Public Administration Review*, *69*, S75-S81.
Xu, M., Kong, G., & Kong, D. (2017). Does wage justice hamper creativity? Pay gap and firm innovation in China. *China Economic Review*, *44*, 186-202.
Yang, L., Lu, J., Wang, Q. S., & Lai, S. (2024). Tax governance and corporate labor investment efficiency: A quasi-natural experiment From China. *Corporate Governance: An International Review*, 1-24.
Yang, W., & Kong, D. (2019). The intra-firm pay gap and the adjustment of human capital structure. *Journal of Financial Research*, *6*, 150-168. (In Chinese).
Yuan, Z., Yang, Y., & Liu, B. (2023). Labour marketisation level and corporate labour investment efficiency: Evidence from China. *Accounting & Finance*, *63*(4), 4729-4760.
Zhou, B., Ge, J., & Ge, P. (2023). Political connections and labor investment efficiency: Evidence from China's private firms. *Economics & Politics*, *35*(3), 696-717.

TABLE I: Descriptive Statistics

Variable	N	Mean	SD	1st quartile	Median	3rd quartile
ABRESID	14,305	0.124	0.155	0.035	0.079	0.152
FPG	14,305	1.617	0.637	1.192	1.592	2.026
SIZE	14,305	15.68	0.973	14.98	15.54	16.23
ROA	14,305	0.047	0.070	0.013	0.041	0.079
LEV	14,305	0.428	0.193	0.279	0.423	0.572
SALESGROWTH	14,305	0.153	0.301	-0.011	0.114	0.265
STD_CFO(/e+09)	14,305	0.031	0.063	0.005	0.011	0.026
STD_SALES(/e+10)	14,305	0.134	0.312	0.015	0.036	0.095
STD_NETHIRE	14,305	0.229	0.361	0.064	0.122	0.238
LABOUR_INTENSITY(/e-04)	14,305	0.008	0.006	0.004	0.006	0.010
PPE	14,305	0.244	0.148	0.130	0.215	0.331
INSTI	14,305	0.445	0.244	0.258	0.461	0.632
INDEP	14,305	0.373	0.053	0.333	0.333	0.429
DUAL	14,305	0.269	0.443	0	0	1
BDSIZE	14,305	2.135	0.195	1.946	2.197	2.197
SOE	14,305	0.346	0.476	0	0	1

Note(s): This table provides descriptive statistics variables included in our baseline regression Model (2). Variable definitions are available in the Appendix A1.

TABLE II: Executive-Employee Pay Gap and Labour Investment Efficiency

Variable	Basic Model (1)	Firm Fixed Effects (2)	PSM (3)
	ABRESID	*ABRESID*	*ABRESID*
FPG	-0.020***	-0.040***	-0.017***
	(-7.005)	(-7.832)	(-5.277)
SIZE	0.005**	-0.010**	0.005*
	(2.230)	(-2.350)	(1.650)
ROA	-0.004	-0.059***	0.000
	(-0.445)	(-3.295)	(0.021)
LEV	-0.015	0.095***	0.014
	(-0.502)	(2.729)	(0.372)
SALESGROWTH	0.035***	0.006	0.031***
	(5.821)	(0.940)	(4.453)
STD_CFO	0.014	-0.005	0.034
	(0.353)	(-0.094)	(0.666)
STD_SALES	-0.016**	-0.029***	-0.023**
	(-2.224)	(-2.732)	(-2.456)
STD_NETHIRE	0.010**	-0.057***	0.009*
	(2.109)	(-9.502)	(1.787)
LABOUR_INTENSITY	-1.864***	-3.808***	-2.146***
	(-6.009)	(-5.439)	(-5.509)
PPE	-0.041***	-0.020	-0.043***
	(-3.410)	(-0.751)	(-3.042)
INSTI	0.005	0.031*	0.008
	(0.675)	(1.739)	(0.912)
INDEP	-0.006	-0.013	0.010
	(-0.180)	(-0.279)	(0.260)
DUAL	0.009***	0.008	0.012***
	(2.634)	(1.585)	(2.988)
BDSIZE	-0.018**	-0.030*	-0.021**
	(-1.988)	(-1.817)	(-1.984)
SOE	-0.015***	-0.007	-0.016***
	(-4.015)	(-1.107)	(-3.509)
CONSTANT	0.181***	0.504***	0.194***
	(4.205)	(6.427)	(3.763)
Year FE	Y	Y	Y
Industry FE	Y	N	Y
Firm FE	N	Y	N
Observations	14,305	14,305	9,596
Adjusted R^2	0.052	0.118	0.051

Note(s): Column (1) reports the results of Model (2) which estimates the effect of the executive-employee pay gap on its labour investment efficiency. Column (2) reports the regression results with firm fixed effects. Column (3) reports the regression results using a PSM-matched sample. The t-statistics are clustered by firm and given in parentheses. The superscripts *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

TABLE III: Instrumental Variable Analysis

Variables	*ABRESID* (1)	1st stage (2)	2nd stage (3)
		EFPG	*ABRESID*
EFPG	-0.028***		
	(-7.481)		
TAXEFFECT		-3.256***	
		(-14.154)	
PRE_EFPG			-0.056**
			(-2.501)
SIZE	0.005**	0.166***	0.010**
	(2.333)	(14.239)	(2.271)
ROA	-0.004	0.213***	0.003
	(-0.387)	(4.445)	(0.298)
LEV	-0.013	1.025***	0.016
	(-0.421)	(8.511)	(0.415)
SALESGROWTH	0.035***	-0.071***	0.033***
	(5.809)	(-3.657)	(5.221)
STD_CFO	0.010	0.020	0.010
	(0.259)	(0.095)	(0.261)
STD_SALES	-0.016**	-0.049	-0.018**
	(-2.314)	(-1.245)	(-2.380)
STD_NETHIRE	0.010**	0.027	0.011**
	(2.076)	(1.343)	(2.257)
LABOUR_INTENSITY	-1.808***	26.654***	-1.094
	(-5.875)	(15.647)	(-1.583)
PPE	-0.040***	0.235***	-0.033**
	(-3.306)	(3.558)	(-2.460)
INSTI	0.005	-0.024	0.004
	(0.656)	(-0.632)	(0.567)
INDEP	-0.005	-0.161	-0.009
	(-0.174)	(-0.898)	(-0.293)
DUAL	0.009***	0.002	0.009***
	(2.609)	(0.152)	(2.654)
BDSIZE	-0.018*	0.067	-0.016
	(-1.907)	(1.272)	(-1.634)
SOE	-0.015***	-0.120***	-0.019***
	(-4.077)	(-5.559)	(-3.939)
CONSTANT	0.178***	-2.645***	0.122**
	(4.161)	(-11.014)	(2.082)
Year FE	Y	Y	Y
Industry FE	Y	Y	Y
F-statistic		59.960	
Wald Chi-squared			320.846
Observations	14,305	14,273	14,273
Adjusted R^2	0.053	0.253	0.047

Note(s): This table presents regression results for the 2SLS analysis. We use *EFPG* as a substitute variable for *FPG* to re-estimate the baseline regression model. *EFPG* is the after-tax pay gap. Column (1) presents the result using *EFPG* as the independent variable. In the first-stage regression of 2SLS, we estimate the after-tax pay gap as a function of tax effect (*TAXEFFECT*) and other control variables. In the second-stage regression, we test the impact of the predicted executive-employee pay gap (*PRE_EFPG*) on abnormal net hiring (*ABRESID*). *TAXEFFECT* is the difference between the virtual pay gap and the real pay gap. All regression models include industry and year-fixed effects. The t-statistics are clustered by firm and given in parentheses. The superscripts *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

TABLE IV: Robustness Checks

Variables	Alternative Independent Var			Alternative Dependent Var		Excluding the impact of external pay gap	Excluding the impact of industrial robots	
	ABRESID	*ABRESID*	*ABRESID*	*Industry_Adjusted ABRESID*	*ABRESID2*	*ABRESID*	*ABRESID*	*ABRESID3*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FPG				-0.027***	-0.032***	-0.021***	-0.020***	-0.005***
				(-9.158)	(-9.182)	(-7.176)	(-7.003)	(-3.011)
GAP1	-0.002***							
	(-4.954)							
GAP2		-0.008***						
		(-6.014)						
GAP3			-0.002***					
			(-4.206)					
IFR							0.000	
							(0.819)	
INDCOM						-0.017*		
						(-1.706)		
SIZE	0.004	0.004	0.003	0.017***	0.007***	0.005**	0.005**	0.004***
	(1.590)	(1.604)	(1.384)	(6.390)	(2.665)	(2.156)	(2.231)	(2.812)
ROA	-0.029	-0.023	-0.031	-0.054*	-0.188***	-0.015	-0.015	-0.058***
	(-0.969)	(-0.781)	(-1.017)	(-1.739)	(-5.658)	(-0.509)	(-0.493)	(-3.507)
LEV	-0.006	-0.009	-0.007	0.005	0.003	-0.004	-0.004	-0.012**
	(-0.677)	(-0.963)	(-0.740)	(0.509)	(0.234)	(-0.438)	(-0.448)	(-2.153)
SALESGROWTH	0.035***	0.034***	0.035***	0.040***	0.067***	0.035***	0.035***	0.083***
	(5.878)	(5.799)	(5.876)	(6.424)	(10.627)	(5.844)	(5.822)	(26.726)
STD_CFO	0.016	0.013	0.016	-0.097**	-0.064**	0.009	0.014	-0.018
	(0.413)	(0.335)	(0.417)	(-2.021)	(-1.989)	(0.247)	(0.353)	(-0.837)
STD_SALES	-0.015**	-0.015**	-0.015**	-0.019**	-0.007	-0.016**	-0.016**	0.002
	(-2.090)	(-2.174)	(-2.139)	(-1.995)	(-0.837)	(-2.269)	(-2.227)	(0.514)
STD_NETHIRE	0.010**	0.009*	0.010**	0.016***	0.014***	0.010**	0.010**	0.010***
	(2.090)	(1.922)	(2.041)	(3.515)	(2.753)	(2.164)	(2.113)	(3.918)
LABOUR_INTENSITY	-2.126***	-2.277***	-2.207***	-2.418***	-1.669***	-1.841***	-1.863***	-0.777***

	(-6.774)	(-7.540)	(-6.987)	(-7.056)	(-4.870)	(-5.943)	(-6.010)	(-4.341)
PPE	-0.043***	-0.045***	-0.044***	-0.050***	-0.033**	-0.040***	-0.041***	-0.026***
	(-3.579)	(-3.791)	(-3.648)	(-3.869)	(-2.417)	(-3.342)	(-3.404)	(-3.805)
INSTI	0.005	0.006	0.005	0.001	0.008	0.005	0.005	-0.000
	(0.715)	(0.869)	(0.725)	(0.148)	(0.986)	(0.689)	(0.680)	(-0.086)
INDEP	-0.004	0.003	-0.004	0.045	0.032	-0.006	-0.006	-0.002
	(-0.138)	(0.083)	(-0.128)	(1.206)	(0.907)	(-0.177)	(-0.178)	(-0.128)
DUAL	0.008**	0.009***	0.009***	0.015***	0.010***	0.009***	0.009***	0.003
	(2.417)	(2.670)	(2.608)	(3.804)	(2.636)	(2.655)	(2.646)	(1.524)
BDSIZE	-0.020**	-0.016*	-0.020**	-0.023**	-0.017	-0.018**	-0.018**	-0.023***
	(-2.139)	(-1.767)	(-2.116)	(-2.079)	(-1.624)	(-1.990)	(-1.981)	(-4.424)
SOE	-0.013***	-0.013***	-0.013***	-0.026***	-0.015***	-0.015***	-0.015***	-0.008***
	(-3.545)	(-3.521)	(-3.547)	(-6.101)	(-3.240)	(-4.034)	(-4.014)	(-3.832)
CONSTANT	0.193***	0.264***	0.199***	0.008	0.196***	0.464***	0.180***	0.142***
	(4.483)	(6.148)	(4.617)	(0.154)	(3.457)	(2.674)	(4.201)	(5.686)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	14,305	14,305	14,305	14,305	16,200	14,305	14,305	13,265
Adjusted R^2	0.049	0.054	0.048	0.040	0.049	0.052	0.052	0.119

Note(s): This table presents the regression results of Model (2) with alternative executive-employee pay gap measures and alternative labour investment efficiency measures. *GAP1* is measured as the average management pay to the average employee pay, where management includes executives, supervisors, and board members. *GAP2* is the natural logarithm of the difference between the top-three executives' average compensation and the employee's average compensation. *GAP3* is the ratio of the top three executives' average compensation to the employee's average compensation. The dependent variable in Column (4) is the absolute difference between net hiring and the industry median of net hiring. The dependent variable for column (5) is the absolute value of the residuals from Model (1) when sales growth is used as the only independent variable. In Columns (6) - (8), we exclude the possible impact of the external pay gap and industrial robots. We include *INDCOM* as an additional control variable in Column (6) to control for the impact of the external pay gap. *INDCOM* is measured as the natural logarithm of the difference between the average compensation of the second-highest-paid executives of the same CSRC industry group and that of the focal firm's executives. In Column (7), we include *t*he robotic penetration rate (*IFR*) to control for the impact of industrial robots. The dependent variable for Column (8) (*ABRESID3*) is the absolute value of the residuals from Model (1) when *IFR* is added as the independent variable. The t-statistics are clustered by firm and given in parentheses. The superscripts *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

TABLE V: Labour and Non-Labour Investment

	Panel A: Capital expenditures		
Variables	*Positive*	*Negative*	*Zero*
FPG	-0.011***	-0.026***	-0.029***
	(-2.807)	(-5.533)	(-3.658)
Control	Y	Y	Y
Year FE	Y	Y	Y
Industry FE	Y	Y	Y
Observations	6,436	6,330	1,539
Adjusted R^2	0.052	0.054	0.060
	Panel B: R&D expenditures		
Variables	*Positive*	*Negative*	*Zero*
FPG	-0.015***	-0.021***	-0.026***
	(-3.162)	(-4.763)	(-4.335)
Control	Y	Y	Y
Year FE	Y	Y	Y
Industry FE	Y	Y	Y
Observations	5,873	5,655	2,777
Adjusted R^2	0.046	0.061	0.047
	Panel C: Advertising expenditures		
Variables	*Positive*	*Negative*	*Zero*
FPG	-0.014***	-0.027***	-0.020***
	(-2.796)	(-4.256)	(-4.896)
Control	Y	Y	Y
Year FE	Y	Y	Y
Industry FE	Y	Y	Y
Observations	3,977	3,408	6,920
Adjusted R^2	0.070	0.070	0.037
	Panel D: Acquisition expenditures		
Variables	*Positive*	*Negative*	*Zero*
FPG	-0.023***	-0.019***	-0.020***
	(-3.418)	(-2.656)	(-5.624)
Control	Y	Y	Y
Year FE	Y	Y	Y
Industry FE	Y	Y	Y
Observations	2,564	2,434	9,307
Adjusted R^2	0.070	0.056	0.046

Note(s): This table presents the results for the impact of non-labour investments on the association between the executive-employee pay gap and labour investment efficiency across the indicated subsamples. Column (1) reports the results for the subsample of firms for which an increase (a decrease) in labour investment is accompanied by an increase (a decrease) in non-labour investments (i.e., a positive relationship between labour and non-labour investments). Column (2) reports the results for the subsample of firms for which an increase (a decrease) in labour investment is accompanied by a decrease (an increase) in non-labour investments (i.e., a negative relationship between labour and non-labour investments). Column (3) reports the results for the subsample of firms with a missing value for non-labour investments (i.e., firms without capital expenditures, R&D expenditures, advertising expenditures and acquisition expenditures) (i.e., zero relationship). The t-statistics are clustered by firm and given in parentheses. The superscripts *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

TABLE VI: Channel Analysis

Variables	*AGENT* (1)	*UNPERK* (2)
FPG	-0.003**	-0.002***
	(-2.230)	(-3.248)
SIZE	0.005***	0.002**
	(3.423)	(2.348)
ROA	-0.075***	0.038***
	(-11.667)	(6.423)
LEV	-0.214***	-0.001
	(-12.868)	(-0.646)
SALESGROWTH	-0.011***	-0.007***
	(-5.497)	(-7.458)
STD_CFO	-0.014	-0.050***
	(-0.927)	(-6.784)
STD_SALES	-0.029***	-0.003*
	(-9.601)	(-1.797)
STD_NETHIRE	0.003	0.000
	(1.538)	(0.442)
LABOUR_INTENSITY	0.026	0.838***
	(0.123)	(8.797)
PPE	-0.038***	-0.010***
	(-4.895)	(-3.278)
INSTI	-0.008*	0.003
	(-1.815)	(1.336)
INDEP	0.020	-0.014
	(1.061)	(-1.504)
DUAL	0.006***	0.001
	(3.007)	(1.139)
BDSIZE	-0.015***	-0.007**
	(-2.583)	(-2.447)
SOE	-0.003	0.001
	(-1.251)	(0.711)
CONSTANT	0.101***	-0.007
	(3.958)	(-0.570)
Year FE	Y	Y
Industry FE	Y	Y
Observations	14,305	14,305
Adjusted R^2	0.283	0.097

Note(s): This table reports the results of the executive-employee pay gap on agency costs (*AGENT/UNPERK*). The t-statistics are clustered by firm and given in parentheses. The superscripts *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

TABLE VII: Additional Analyses

Variables	*ABRESID*
	(1)
FPG	-0.021***
	(-7.098)
ESOP	-0.041***
	(-2.739)
*FPG*ESOP*	0.020***
	(2.784)
SIZE	0.005**
	(2.276)
ROA	-0.004
	(-0.451)
LEV	-0.015
	(-0.496)
SALESGROWTH	0.035***
	(5.819)
STD_CFO	0.011
	(0.279)
STD_SALES	-0.016**
	(-2.227)
STD_NETHIRE	0.010**
	(2.120)
LABOUR_INTENSITY	-1.870***
	(-6.022)
PPE	-0.042***
	(-3.453)
INSTI	0.005
	(0.654)
INDEP	-0.006
	(-0.186)
DUAL	0.009***
	(2.612)
BDSIZE	-0.019**
	(-1.995)
SOE	-0.015***
	(-4.049)
CONSTANT	0.181***
	(4.190)
Year FE	Y
Industry FE	Y
Observations	14305
Adjusted R^2	0.052

Note(s): This table shows the moderating effects of employee stock ownership plans (*ESOP*). The t-statistics are clustered by firm and given in parentheses. The superscripts *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

TABLE VIII: Over-Investment and Under-investment

Panel A subsamples of over-investment and under-investment.

	Positive abnormal net hiring	Negative abnormal net hiring
Positive expected net hiring	Over-hiring	Under-hiring
Negative expected net hiring	Under-firing	Over-firing

Panel B The effect of executive-employee pay gap on over-investment (over-hiring and under-firing) and under-investment (under-hiring and over-firing)

Variables	Over-investment			Under-investment		
	(1)	(2)	(3)	(4)	(5)	(6)
	Total	*Over-hiring*	*Under-firing*	*Total*	*Under-hiring*	*Over-firing*
FPG	-0.041***	-0.064***	-0.014***	-0.004**	-0.005**	-0.004
	(-7.189)	(-7.286)	(-3.094)	(-2.042)	(-2.242)	(-1.079)
Control	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Observations	5,893	3,518	2,375	8,412	6,604	1,808
Adjusted R2	0.077	0.097	0.036	0.060	0.063	0.059

Note(s): This table shows the subsample test results. Panel A shows the categorization of observations into each subsample. Panel B presents the results of estimating Module (2) on various subsamples. Over-investment exists when firms have positive abnormal net hiring, and it includes *Over-hiring* (when the expected net hiring is positive) and *Under-firing* (when the expected net hiring is negative) subsamples. Under-investment exists when firms have negative abnormal net hiring, and it includes *Under-hiring* (when the expected net hiring is positive) and *Over-firing* (when the expected net hiring is negative) subsamples. The t-statistics are clustered by firm and given in parentheses. The superscripts *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

TABLE IX: Labour Cost Stickiness

Variables	$Ln\ (LabCost_{it} / LabCost_{it-1})$
	(1)
$Ln(Rev_{it} / Rev_{it-1})$	0.455***
	(42.756)
$Decr_{it} \times Ln(Rev_{it} / Rev_{it-1})$	-0.471***
	(-7.440)
$Decr_{it} \times Ln(Rev_{it} / Rev_{it-1}) \times FPG_{it}$	0.128***
	(4.015)
$Decr_{it} \times Ln(Rev_{it} / Rev_{it-1}) \times AI_{it}$	-0.002
	(-0.377)
$Decr_{it} \times Ln(Rev_{it} / Rev_{it-1}) \times Suc\_Decr_{it}$	0.129***
	(3.965)
$Decr_{it} \times Ln(Rev_{it} / Rev_{it-1}) \times LOSS_{it}$	0.102**
	(2.522)
FPG_{it}	0.011***
	(4.731)
AI_{it}	0.002
	(1.595)
Suc_Decr_{it}	-0.011*
	(-1.914)
$LOSS_{it}$	-0.109***
	(-17.768)
CONSTANT	0.062**
	(2.293)
Year FE	Y
Industry FE	Y
Observations	27,775
Adjusted R^2	0.361

Note(s): This table presents the results for the effect of the executive-employee pay gap on labour cost stickiness. The dependent variable, $Ln\ (LabCost_{it}/LabCost_{it-1})$, is the natural logarithm of changes in labour costs, where labour costs include wages, salaries, and other benefits paid to employees. *Rev* is total revenue. *Decr* is a dummy variable equal to one if total revenue decreased from the previous year and zero otherwise. *FPG* is our main proxy for the executive-employee pay gap. *AI* is the ratio of total assets to total revenue. *Suc_Decr* is a dummy variable equal to one if a firm's revenue decreased for two consecutive years and zero otherwise. *LOSS* is a dummy variable equal to one if a firm's *ROA* is negative in the current year and zero otherwise. The t-statistics are clustered by firm and given in parentheses. The superscripts *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

APPENDIX

TABLE A1: Variable Definitions

Variable	Definition
ABRESID	Inefficient labour investment, measured by the absolute value of residuals generated from Model (1).
ABRESID2	Alternative measure of labour investment inefficiency, measured by the absolute value of residuals generated from Model (1) using *SALEGROWTH* in the previous year as the sole independent variable.
ABRESID3	Alternative measure of labour investment inefficiency, measured by the absolute value of residuals generated from Model (1) after adding the application of industrial robots (*IFR*) as an additional independent variable.
AGENT	A measure of agency cost, measured by the ratio of management expenses to total revenue.
AI	Asset intensity, measured by the ratio of total assets to total revenue.
ASSET	Total assets.
AUR	Asset turnover ratio, measured by the ratio of total sales revenue to total assets.
BDSIZE	Board size, measured by the natural logarithm of the total number of directors on the board.
CHROA	Changes in firm performance (*ROA*).
CHQUICK	Changes in the quick ratio (*QUICK*).
Decr	Indicator variable, coded one if total revenue decreased from the previous year, and zero otherwise.
DUAL	CEO duality, indicator variable coded one when the CEO serves also as the chairman of the board, and zero otherwise.
EFPG	The after-tax pay gap, measured by the natural logarithm of the ratio of the average after-tax pay of executives to the average after-tax pay of employees.
ESOP	Employee stock ownership plan, indicator variable coded one if the firm has adopted employee stock ownership plans in a given year and zero otherwise.
FPG	Executive-employee pay gap, measured as the natural logarithm of the ratio of average executive pay to average employee pay.
GAP1	Alternative measure of the pay gap, measured by the ratio of the average pay of top management teams to average employee pay. Top management teams include executives, supervisors, and board members.
GAP2	Alternative measure of the pay gap, measured by the natural logarithm of the difference between the top three executives' average pay and the average employees' pay.
GAP3	Alternative measure of the pay gap, measured by the ratio of the top-three executives' average pay to employees' average pay.
Industry_Adjusted ABRESID	Alternative measure of labour investment inefficiency, measured by the absolute value of deviations between actual net hiring (*NET_HIRE*) and median net hiring in each industry-year pair.
IFR	The application of industrial robots, measured by the robotic penetration rate according to Duan et al. (2023).
INSTI	The percentage of institutional shareholdings.
INDCOM	Executives' external incentive, measured as the natural logarithm of the difference between the average compensation of the second-highest-paid executives of the same industry group and that of the focal firm's executives.
INDEP	Board independence, measured by the proportion of independent

	directors.
INV	Total inventory.
LabCost	Labour costs, including wages, salaries, and other benefits paid to employees.
LABOUR_INTENSITY	Labour intensity, measured by the number of employees divided by total assets.
LEV	Leverage ratio, measured by the ratio of total long-term debt to total assets.
LNEMPLOYEE	The natural logarithm of the number of employees.
LOSS	Indicator variable, coded one for firms with negative *ROA*, and zero otherwise.
LOSSBINX	Five separate loss bins to indicate each 0.005 interval of *ROA* from 0 to -0.025. Specifically, *LOSSBIN1* is equal to 1 if *ROA* is between -0.005 to 0, *LOSSBIN2* is equal to 2 if *ROA* is between -0.005 to -0.010, *LOSSBIN3* is equal to 3 if *ROA* is between -0.010 to -0.015, *LOSSBIN4* is equal to 4 if *ROA* is between -0.015 to -0.020, *LOSSBIN5* is equal to 5 if *ROA* is between -0.020 to -0.025, and otherwise they are equal to zero.
NET_HIRE	Net hiring activities, measured by the percentage change in the number of employees in the current year.
NPPE	The net value of property, plant, and equipment.
Perk	Management expenses excluding bad debt expenses, unrealized holding gain or loss for inventory if any, and direct compensation for directors and top executives
PPE	Tangible asset ratio, measured by the property, plant, and equipment divided by total assets.
QUICK	Quick ratio, measured by the ratio of the sum of cash and short-term investments and receivables to current liabilities.
Rev	Total revenue.
RETURN	The annual stock return.
ROA	Firm performance, measured by the net income scaled by total assets.
SALESGROWTH	Sales growth, measured by the percentage change in sales revenue.
ΔSALE	The change in sales revenue.
SIZE	Firm size, measured by the natural logarithm of market value.
SIZE_R	Size rank, measured by the percentile rank of *SIZE*.
SOE	Indicator variable, coded one if the firm is a state-owned enterprise, and zero for non-state-owned enterprise.
STD_CFO	The standard deviation of cash flows from operations over a five-year window.
STD_NETHIRE	The Standard deviation of the change in the number of employees over a five-year window.
STD_SALES	The standard deviation of sales revenue over a five-year window.
Suc_Decr	Indicator variable, coded one if a firm's revenue decreased for two consecutive years, and zero otherwise.
TAXEFFECT	The adjustment effect of personal income tax, measured by the difference between the virtual pay gap and the real pay gap. The virtual pay gap is the result of the average pay adjustment for executives and ordinary employees in year t-1 due to the tax rate in year t. The real pay gap is the result of the average pay adjustment for executives and ordinary employees in year t due to the tax rate in year t.
UNPERK	Executive perquisites, measured by the residuals generated from Model (5).

TABLE A2: Pearson Correlations

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
ABRESID	(1)	1						
FPG	(2)	-0.087***	1					
SIZE	(3)	-0.008	0.306***	1				
ROA	(4)	0.026***	0.242***	0.380***	1			
LEV	(5)	-0.006	0.014	0.016*	-0.329***	1		
SALESGROWTH	(6)	0.075***	0.054***	0.171***	0.369***	0.018**	1	
STD_CFO	(7)	-0.028***	0.137***	0.513***	0.017**	0.279***	-0.032***	1
STD_SALES	(8)	-0.025***	0.144***	0.496***	0.022***	0.283***	-0.024***	0.813***
STD_NETHIRE	(9)	0.027***	0.067***	0.096***	-0.029***	0.056***	0.014*	0.055***
LABOUR_INTENSITY	(10)	-0.039***	0.200***	-0.239***	0.003	-0.005	-0.028***	-0.195***
PPE	(11)	-0.037***	0.022***	-0.083***	-0.143***	0.182***	-0.048***	0.128***
INSTI	(12)	0.012	0.111***	0.325***	0.168***	0.188***	0.059***	0.284***
INDEP	(13)	0.006	-0.019**	0.030***	-0.034***	-0.026***	-0.013	0.046***
DUAL	(14)	0.026***	0.020**	-0.012	0.023***	-0.095***	0.019**	-0.067***
BDSIZE	(15)	-0.018**	0.055***	0.140***	0.026***	0.180***	0.006	0.181***
SOE	(16)	-0.006	-0.095***	0.005	-0.081***	0.257***	-0.065***	0.196***

TABLE A2: Pearson Correlations (continued.)

		(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
STD_SALES	(8)	1								
STD_NETHIRE	(9)	0.115***	1							
LABOUR_INTENSITY	(10)	-0.144***	0.031***	1						
PPE	(11)	0.092***	-0.044***	0.080***	1					
INSTI	(12)	0.292***	0.038***	0.050***	0.172***	1				
INDEP	(13)	0.034***	0.003	-0.041***	-0.048***	-0.094***	1			
DUAL	(14)	-0.067***	-0.009	-0.026***	-0.130***	-0.197***	0.124***	1		
BDSIZE	(15)	0.171***	0.006	0.025***	0.140***	0.261***	-0.524***	-0.202***	1	
SOE	(16)	0.190***	0.013	0.082***	0.200***	0.376***	-0.088***	-0.263***	0.286***	1

Note(s): This table shows the Pearson correlation coefficients for the variables included in our Model (2). The sample size is 14,305 firm-year observations. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

TABLE A3: Comparison of Control Variables before and after PSM

Panel A. Differences in characteristics between treated firms and control firms before PSM

Variables	Treated firms	Control firms	Difference	t statistics
SIZE	0.424	0.432	-0.008	-2.418**
ROA	0.136	0.171	-0.035	-6.880***
LEV	0.026	0.037	-0.011	-10.489***
SALESGROWTH	0.104	0.164	-0.06	-11.449***
STD_CFO	0.209	0.250	-0.041	-6.802***
STD_SALES	0.007	0.009	-0.002	-20.686***
STD_NETHIRE	0.240	0.247	-0.007	-3.073***
LABOUR_INTENSITY	0.423	0.466	-0.043	-10.656***
PPE	0.374	0.372	0.002	2.916***
INSTI	0.266	0.272	-0.006	-0.768
INDEP	2.124	2.146	-0.022	-6.836***
DUAL	0.382	0.311	0.071	9.045***

Panel B. Differences in characteristics between treated firms and control firms after PSM

Variables	Treated firms	Control firms	Difference	t statistics
SIZE	0.435	0.433	0.002	0.600
ROA	0.158	0.155	0.003	0.560
LEV	0.031	0.031	0.000	-0.160
SALESGROWTH	0.132	0.133	-0.001	-0.130
STD_CFO	0.227	0.224	0.003	0.400
STD_SALES	0.007	0.007	0.000	-0.050
STD_NETHIRE	0.247	0.247	0.000	0.180
LABOUR_INTENSITY	0.439	0.440	-0.001	-0.220
PPE	0.371	0.373	-0.002	-1.280
INSTI	0.265	0.263	0.002	0.190
INDEP	2.142	2.138	0.004	0.960
DUAL	0.338	0.349	-0.011	-1.100